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PROGNOSIS OF SIGHT SINGING ABILITY OF NORMAL SCHOOL STUDENTS

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AND

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Until recently all freshmen students of the Bellingham State Normal School who elected the Primary, Intermediate, or Rural Curricula have been required to take three courses in music in preparation for their work as teachers. The ability to sight sing has been considered an essential part in this preparation, and training in this ability together with the study of methods of music instruction have made up the content of the courses. Very apparent variations in the ability of students to pursue these courses seemed to call for the sectioning of classes on the basis of ability to do the work. To accomplish this end some means had to be devised for predicting in advance the ability of the students to profit by the instruction given. Confronted with this situation the Bureau of Research and a member of the Music Department set about to select or devise, and then evaluate tests for predicting ability in sight singing.

This report covers the work of three years: a first year of exploration for test materials, a second year of evaluation of these materials in an experimental set-up, and a third year of verification of results with a second experimental group. At the beginning of the search for prognostic data it was thought that the most fruitful materials were to be found in tests of achievement in those phases of musical instruction which seemed to be related closely to sight singing. Working in line

with this idea an achievement test was devised and tried out during the year 1925–26. It was likewise thought that some one or more of the six Seashore tests of musical ability—pitch, tonal memory, time duration, intensity, consonance, and rhythm—might carry some prognostic value, and these were given. Scores on Part I of the Thorndike Examination for High School Graduates, series 1919–24, were available and were made a part of the data. Using a crude and somewhat subjective measure of sight singing as a criterion, correlations (Pearson product moment) were obtained, and partial regression weights determined. The results of this preliminary survey were such as to warrant a more carefully controlled experiment during the next school year, and obvious limitations revealed in the preliminary findings made such a procedure necessary.

There follows a brief exposition of the main features of the experimental set-up as planned for the second year's work beginning in the fall quarter of 1926, in which note will be taken of some of the significant findings of the preliminary work of the previous year.

THE 1926 TESTS

1. A prime requisite for the study was a reliable test which would serve as a valid criterion of sight singing ability. Such a test was devised and proved to have the desired reliability, a coefficient of .98 being obtained by the Spearman-Brown formula. The test consisted of four short songs of from eight to twenty measures, graded from easy to moderate difficulty and in keeping with the objectives of the first quarter's work. All tests were given by Mr. Smith to one student at a time. The scoring was done on the basis of note and time interval values, the single note or interval being the scoring unit.

2. Experience of the first year revealed two of the six Seashore tests, pitch and tonal memory, as likely to prove significant in the prediction of sight singing. In the preliminary survey these two tests had shown correlations above .60 with the crude sight singing criterion. To secure the best results from these tests, procedures for giving them were carefully

revised with special emphasis upon adequate directions and practice exercises. Each Seashore test was given twice to increase the reliability of the data, to permit of the computation of reliability coefficients, and to permit of the discovery of cases for retesting when marked differences were obtained in the scores of the two trials.

3. In the original survey the achievement test had proven to be the best single basis for prediction of the criterion. The test was faulty in that many of its parts as well as the test as a whole produced large percentages of zero scores. In the revision of the test for the second year a fairly successful attempt was made to make each part of the test a measuring instrument of sufficient accuracy to warrant its use by instructors for diagnostic purposes. The test was divided into two parts, two class periods of fifty minutes each being required for the giving. The different parts of the test are as follows, the names indicating with sufficient accuracy for our purpose the nature of the parts: so-fa syllables, dictation, lines and spaces, symbols, recognition of familiar songs from notation, key signatures, scales, notes and rests, vocabulary, and measures. The dictation test had shown itself of distinct merit in the preliminary survey and is discussed in the next paragraph.

4. The dictation part of the achievement test presents a series of simple situations in each of which the student listens to a series of four tones sounded upon the piano, listens again to two repetitions of these same four tones and then writes "the notes for the tones played" on a staff provided for the purpose. Its merit as disclosed in the preliminary survey led to special consideration for its revision in order that it become an effective prognostic instrument. The test was lengthened with the introduction of easier materials designed to reduce the number of zero scores, and some progress was made in scaling the items in point of difficulty. Distribution of scores at the beginning of the quarter showed about ten per cent of zero scores, but when given at the end of the quarter gave a distribution characteristic of a good differentiating instrument. This test was given as a part of the achievement

test, but when the achievement test was found to correlate with the criterion only .474 the dictation test was withdrawn and made an independent prognostic unit. That this was advisable is seen from its correlation with the criterion .596. The remainder of the test, after its removal, correlates with the criterion but .403. It is of interest to note that the dictation test correlates with the remainder of the achievement test .766. This presents an interesting example of the way in which parts of tests may destroy the predictive effectiveness of other parts when statistical procedures are not employed to determine correct weightings.

5. The correlation of intelligence scores with the crude sight singing criterion used in the preliminary study was .03, and with the other measures of musical ability and achievement, had not exceeded .22, most of the coefficients being close to .20. It seemed worth while to include this test in the battery of prognostic data to be tried out, to show to what extent it was correlated with the wide scope of tests of musical abilities and achievements involved in the study.

6. Data concerning the previous training of each student was secured and a composite derived by summing (*a*) the reported number of years instruction in grades one to eight and in high school and (*b*) twice the number of years of private instruction, irrespective of the kind of such private instruction.

7. The final grades of the instructors given at the end of the quarter were made a part of the records. The grades, for this purpose, were given in half points of the usual five point system (A+, A−, B+, etc.). The dictation test was given again at the end of the quarter and some use was made of it in determining grades, but the grades were for the most part of the subjective order.

THE 1926 EXPERIMENTAL GROUP

The results of the preliminary survey of the first year, supplemented by observations in the classroom of the relations between sight singing ability and the scores on pitch, tonal memory and the achievement test, led to a sectioning of the

beginning students in the fall of 1926. About 35 per cent of the group were excused from the first course and entered directly upon the work of the second of the three music courses. The experimental group of 131 students came to be made up of three classifications of students as follows: (*a*) 70 beginners who took the first of the three courses in music, (*b*) 38 beginners who were excused from taking the first course and who entered directly upon the work of the second course, (*c*) 23 students who had previously taken the first course and were pursuing the work of the second course. Inasmuch as the main objective of the study was to organize prognostic data for students who have had no music in the normal school, the introduction of this third group of 23 experienced students was not in line with our purpose and undoubtedly operated to lower the accuracy of predictions. Such an effect is to be expected from the fact that scores on the dictation test would reflect the quarter's work which the 23 students had had, and thus tend to predicted scores in sight singing out of harmony in predictive significance with those gotten by the less experienced part of the group. Their inclusion, however, made possible some worthwhile comparisons between the groups.

The group of 38 students who went directly into the second course were confronted with a learning situation which was, for their ability, supposedly comparable to that which confronted the students taking the first course. The second course was a continuation of the sight singing of the first course, combined with consideration of teaching methods. Data to be presented later will show this group to have excelled in sight singing above their prediction while the first course group averaged in the sight singing test almost exactly the average of the predicted scores. This result is in line with the usual findings for such situations—the students with the greater ability make the greater gain.

1926 RESULTS

In table 1 below will be found the correlations between the variables. The reliability coefficients as computed by the

Spearman-Brown formula appear in parenthesis. For the Seashore tests the scores from one full giving of the test were correlated with the scores from the second giving of the test, which immediately followed. The two halves of the sight singing test and the dictation test were obtained by summing the scores of alternate measures. Alternate items of the information test were used to make up the two halves. The reliability coefficient of Part I of the Thorndike Intelligence

TABLE 1

Coefficients of correlation between sight singing (0), pitch (1), tonal memory (2), time (3), intensity (4), rhythm (5), consonance (6), training (7), intelligence (8), music achievement (9), dictation (10)

N = 131 (decimal points omitted to conserve space)

VARIABLE NUMBER	0 S.S.	1 P	2 T.M.	3 T	4 I	5 R	6 C	7 Tr.	8 Int.	9 Ach.	10 D
0	(978)	604	641	022	263	199	327	425	248	403	596
1	604	(932)	485	381	320	202	341	417	314	469	538
2	641	485	(935)	394	407	511	323	259	243	347	454
3	022	381	394	(828)	434	420	321	117	304	262	565
4	263	320	407	434	(921)	251	307	071	151	151	201
5	199	202	511	420	251	(834)	061	069	022	137	154
6	327	341	423	321	307	061	(696)	254	005	291	369
7	425	417	259	117	071	069	254	(?)	038	509	527
8	248	314	243	304	151	022	005	038	(899)	329	277
9	403	469	347	262	151	137	291	509	329	(984)	766
10	596	538	454	565	201	154	368	527	277	766	(920)
Mean..	86.19	77.61	69.45	76.39	87.70	76.69	71.52	7.55	190.23	146.34	43.76
Sigma..	45.26	9.46	15.28	8.27	5.78	7.22	7.53	6.49	26.63	70.8	32.40

Test is taken from Woods, "Measurement in Higher Education," page 49.

The reader, in comparing the reliability coefficients for the Seashore tests reported here with coefficients reported in other studies should bear in mind the differences in the tests situations. The Seashore tests after they have once been taken are not apt to challenge a continuation of interest. It is, therefore, to be expected that performance on the repetition of these

tests will vary with the amount of motivation provided to maintain attention. The coefficients reported above are derived from a set-up in which motivation of a relatively high order was provided, the testees being made to feel that the results of the tests were a part of a practical problem of adjusting them to best advantage in one or another of the musical courses. The writers believe that any large discrepancies between coefficients reported here and by other investigators are explainable in terms of differences in motivation and that with similar motivation similar coefficients will be forthcoming. It may be added that the coefficients derived in connection with a practical set-up are to be preferred for practical use.

A survey of the correlations of the independent variables with the criterion, table 1, shows three of the ten to stand out from the others as probable contributors to a composite for predicting sight singing. Tonal memory has the higher correlation, .641, while pitch and dictation with correlations of approximately .60, are close seconds. In the paragraphs immediately following, the regression weights and the multiple correlation coefficient are given for a variety of combinations of variables for the purpose of showing the effect of adding a third or a fourth variable to two or three others already included in a composite.

Pairs of variables combine to give multiple correlation coefficients as follows, the regression weights for standard measures being indicated in parenthesis: pitch (weight .39) and tonal memory (weight .45) give a multiple correlation coefficient with sight singing of .723; pitch (weight .39) and dictation (weight .39) give a multiple correlation of .68; tonal memory (weight .46) and dictation (weight .39) give a multiple correlation of .73. The three independent variables, pitch (weight .26), tonal memory (weight .39) and dictation (weight .27) combine to give a multiple correlation coefficient of .753. When predicted scores for sight singing obtained from the combined weighted scores of these three variables are correlated with the actual sight singing scores an empirical coefficient of .689 was obtained. When information, weight .08, is com-

bined with pitch, weight .35, and tonal memory, weight .44, a multiple correlation of .725 is obtained, a meager increase over that of .723 obtained with pitch and tonal memory alone.

When any fourth variable is added to pitch, tonal memory, and dictation, the increase in predictive power, as judged by the increase in the multiple correlation, is not sufficient to warrant its inclusion. When training with a weight of .09 is added, pitch takes a weight of .24, tonal memory .39 and dictation .24 to give a multiple correlation of .759 as compared with .753 for the three variables alone. When consonance is added its weight is but .01, and the change in the multiple correlation is insignificant. Intensity takes a negative weight .03, while

TABLE 2

Coefficients of correlations between sight singing T-scores, dictation T-scores, tonal memory, and pitch (scores above 80 in pitch = 80 + 2 (X − 80), and retests for pitch and tonal memory used to get the "Best" measure)

Means and sigmas approximate closely those given in table 1.

VARIABLE	TONAL MEMORY	PITCH	DICTATION
Sight singing	.644	.624	.621
Tonal memory		.549	.419
Pitch			.579

intelligence takes a negative weight of .01, and rhythm a negative weight of .09, each having but little effect upon the multiple correlation. Both time and information when combined with these three variables take negative weights due to correlations with one or more of the other three variables which are relatively much higher than the correlation with the criterion sight singing.

Selecting the variables pitch, tonal memory, dictation, and the criterion sight singing for careful study, an attempt was made to refine the data for these variables for the purpose of securing better predictive results. The sight singing scores and the dictation scores gave distributions which suggested the

conversion of the raw scores into T-scores to smooth out unequal steps of difficulties in these measures. The correlation sheet for pitch and the criterion showed a marked tendency toward a curvilinear relation for pitch scores above 80. Pitch scores above 80 were interpreted so that any excess above 80 was doubled, this with the intent of giving a rectilinear relation throughout the full range of scores.[1] For both pitch and tonal memory there were a number of students to which the third and fourth tests had been given because the first and second were not in close agreement. More reliable scores were obtained for such cases by taking the average of the the two or three tests which were in closest agreement. The correlations obtained from these refined data are given in table 2.

These correlations do not vary greatly from those based on the original data. With this new data, the three variables take regression weights as follows: tonal memory .385, pitch .22, and dictation .33, to give a multiple correlation with sight singing of .769 as compared with .753 for the original data. The empirical coefficient between predicted and actual sight singing was .708 as compared with .689 of the original data.

THE 1927 EXPERIMENT

Table 3 contains the raw correlations from the work of the third year. The experimental group contained 144 entering freshmen taking Music in the fall quarter of 1927. They were sectioned on the basis of predicted sight singing grades, those getting a predicted score of + .40 (standard measure) being transferred to the second course. The predicted scores were obtained by using the regression equation derived from the 1926 study, using the variables pitch, tonal memory and dictation. Nearly 50 per cent of those enrolling were promoted, the group being apparently select. At the end of the quarter individual sight singing tests were given, using a test which was an improvement over that used the year before. The scoring of the sight singing test was changed from the single note as a unit to the measure as a unit, any mistake in pitch within

[1] Kelley, Truman L.: Statistical Method, p. 188.

a measure counting the measure wrong for pitch and two points were deducted, and any mistake in time intervals making the measure wrong for time and one point was deducted.

The pitch test was modified also, the reverse side of the record being marked so that the more difficult section of the test was given last, the whole test being thus scaled from the less difficult to the more difficult. The pitch test was also given as planned by the author and the correlation was obtained from 143 pairs of scores given the two ways. The score in each case was the average of scores from two givings of the test. The coefficient obtained was .895 with a probable error

TABLE 3

Correlations from data of Fall of 1927

	DICTATION	TONAL MEMORY	PITCH	CONSONANCE	INTELLIGENCE	RHYTHM	TIME	MEANS	SIGMAS
Sight singing..	.785	.656	.645	.303	.267	.281	.372	138.83	58.40
Dictation.....		.576	.542	.283	.301	.318	.342	55.21	32.30
Tonal memory.			.595	.263	.335	.510	.394	74.07	14.53
Pitch.....				.304	.392	.427	.448	80.02	8.25
Consonance...					.378	.085	.318	68.92	6.86
Intelligence...						.237	.492	87.33	6.75
Rhythm.....							.473	78.18	8.26
Time.....								77.10	7.09

of .036. The means were practically the same, 80.40 and 80.16, as were the sigmas, 7.85 and 7.67. The reliability coefficient obtained for pitch from the 1926 data was .932, suggesting that the coefficient .895 is essentially of the nature of a reliability coefficient. The correlations with the criterion sight singing are: for the revised order .645, and for the regular order .656. The correlations of pitch scored in the regular order and dictation is raised to .576, and with tonal memory to .623, and these new data operate only to lower the regression weight of tonal memory to .21 and thus lead to a slightly lower multiple coefficient. These data thus seem to indicate that any differences arising from the order of giving the last half of the pitch test are not such as to justify the change from the regular order.

The regression equation derived from the 1927 data gives the dictation test the weight .54, while pitch and tonal memory are both .22. The multiple coefficient is .842 with the empirical coefficient in close agreement, .835. As was true of the previous year, a fourth variable does not effect any significant increase in the multiple correlation.

The probable error of estimating a true score in sight singing from the composite score derived from the regression equation is approximately .27 of a standard deviation.[2] When a five point grading system is used, it is fairly accurate and very convenient to think of the standard deviation as the range of a grade point. Thus a table of chances of error of an obtained standard score varying from the "true" standard score may be set up as follows: there is an even chance of the obtained score being within .27 of a grade point of true score; 4 to 1 chance of the obtained score being within .54 of a grade point of true score; 20 to 1 chance of the obtained score being within .81 of a grade point of true score; 140 to 1 chance of the obtained score being within 1.08 of a grade point of the true score.

In this table is found a practical picture of the limits of accuracy with which the scores of the tests of pitch, tonal memory, and dictation given at the beginning of a quarter's work may be combined to predict the sight singing ability of students at the end of the quarter.

When the 1926 weights are used as a basis for prediction, the empirical coefficient equals .788, higher than the multiple coefficient of the 1926 data. These results justify the work of verification of the third year. The problem remains, however, of choosing the means and sigmas of independent variables to be used in computing standard measures. A comparison of means and sigmas in tables 1 and 3 shows the 1927 group to vary from the 1926 group. When classes of the winter and spring quarters of 1927 were averaged with the students of the fall quarter the means and sigmas for the year approximated closely those of the previous year. The means and sigmas of the students of a whole year will be made the basis for

[2] Using the formula, $P.E._{1.2} = .6745\sqrt{1 - r_{12}}$.

the regression equations of the future, in this way putting the classification of students from quarter to quarter on a comparable basis. The following table gives the means and sigmas and regression weights adopted for this purpose.

TEST	MEANS	SIGMA	WEIGHT
Pitch	77.6	9.5	.22
Tonal memory	69.5	15.3	.22
Dictation	43.8	32.4	.54

The routine of classification has been simplified by making tables for converting the raw scores in dictation, pitch, and tonal memory into the weighed standard measures for the regression equations. In constructing one of these tables the lowest probable raw score is first converted into a WZ score by the formula:

$$WZ = W\frac{X - M}{\text{Sigma}},$$

W being the regression weight, X, the raw score, M the Mean, and sigma the standard deviation for the given variable. Having determined the lowest WZ score each succeeding WZ score is obtained by adding to the last a WZ increment equivalent to one raw score. This increment is obtained by the formula, WZ increment for 1 point in raw score $= W\frac{1}{\text{Sigma}}$. For raw scores below the mean the WZ scores will of course be negative and above the mean they will be positive. With these tables at hand the work of classification becomes a matter of giving and scoring the tests, converting the raw scores to WZ measures for the three independent variables, and summing the three WZ measures to give the predicted Sight Singing scores. Classes in the first two courses are scheduled at the same time so that by the third or fourth meeting of the class students securing the necessary predicted score, (plus .4 has been used to date), may be transferred to the second course.

From experience to date, the program of classifying students has led to about 5 per cent being excused from two of the three courses in music, leaving but one course to complete, while about 35 per cent are excused from the first course and take the other two. About 40 to 50 per cent are able to prepare for the other courses by taking the first course, and from 10 to 20 per cent are so deficient in ability to discriminate pitch and in other abilities (tonal memory and perhaps other factors not measured in our study) that they seem incapable of passing the first course. Repetitions of the first course have been tried by a few of such students but without satisfactory results.

The question arises as to the comparative attainment of the two segregated groups, those who were promoted to the second

TABLE 4

Frequency distributions of grades in sight singing test of students promoted to Music 2 and those taking Music 1—1927 group

GROUP	FREQUENCIES OF GRADES IN SIGHT SINGING					TOTALS
	A	B	C	D	F	
Promoted to Music 2	5	36	28	3		72
Taking Music 1		9	22	28	13	72

course, as compared with those who took the first course. Table 4 shows the frequency distribution of grades (standard scores) in the sight singing test for these respective groups.

In interpreting the data of table 4 it should be remembered (*a*) that the students were promoted to Music 2 on predicted scores of +.4 or better: (one student with a predicted score of +.495 insisted on taking the first course); (*b*) that conditions for learning sight singing varied somewhat for the two groups, the level of subject matter, etc., being different. Both courses dealt with sight singing; (*c*) the students promoted took their place in Music 2 classes with students who had previously successfully completed Music 1.

The mean predicted score for the Music 2 group was +.844 (interpreted by 1926 data). For the group retained in Music 1

the mean predicted score was −.404, a difference of about one and one fourth sigmas. The mean actual score interpreted by 1927 data for the music 2 group was +.662 and for the music 1 group −.691, a difference of approximately one and one-third sigmas. The quarter of training appears to have increased slightly the differences found in the two groups at the beginning of the quarter.

The experimental group of 1926 it will be recalled was made up of three groups. It is of interest to compare the predicted and actual sight singing scores of these three groups. The group retained in the beginning course had a mean predicted score of −.46, and their mean actual sight singing score was −.45. The group promoted to the second course had a mean predicted score of +.59 and actual scores of +.72. The group in the second course who had already taken the first course had a mean predicted score of +.20 and a mean actual score of +.02.

SUMMARY

After a year of exploration of test materials for predicting sight singing ability for normal school students, the materials were evaluated with an experimental group of 132 students. The following year 1927–28, a second experimental group of 144 students was used to verify the results of 1926.

Along with other prognostic materials the Seashore tests of musical abilities, pitch, tonal memory, time, intensity, consonance, and rhythm, were validated for prediction of sight singing. Pitch and tonal memory were found to have very significant predictive value, the correlations with the criterion being between .60 and .65, respectively, and in the regression equations involving other prognostic materials, took significant weights. The other four Seashore tests were of decidedly less value for the purpose at hand.

Measures of factual knowledge about music notation proved of small prognostic value in contrast with the two Seashore tests and in contrast with measures which involved auditory perception or imagery as well as knowledge of notation. The test of this last named order of greatest value was a tonal dicta-

tion test. The dictation test correlated with the criterion .60 the first year, and .79 the second year, with a group giving a wider distribution of scores.

The most effective combination for predicting sight singing is gotten by weighting the standard scores of dictation .54, pitch .22 and tonal memory .22, resulting in a multiple correlation of .84, and a probable error of .27 of a sigma in predicting true scores.

This predictive instrument has been used for selecting students for immediate promotion to an advanced course in sight singing, and the experience in the practical situation has been found to be in general accord with the experimental results. Promoting to the advanced course students obtaining predicted sight singing scores of +.4 or better, it was found that less than 5 per cent obtained sight singing scores which would be interpreted as below grade C of a five point system of grading.

THE MALADJUSTED COLLEGE STUDENT—A FURTHER STUDY WITH RESULTS[1]

EMILY LEATHERMAN STOGDILL, PH.D.

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I. INTRODUCTION

Colleges have always had students whose behavior created problems for the administration. About the only treatment accorded to these miscreants was to sever their connection with the school. They were regarded for the most part as educationally impossible. All that the college could do for them was to protect itself from their annoying presence. But within the past ten years a new viewpoint in regard to these students has begun to change the attitude of workers here and there in college circles. With the new understanding of the motives back of undesirable and unsocial conduct, it has become evident that severe entrance examinations and rigorous elimination of those who fail to measure up to a certain academic standard are by no means adequate measures for meeting either the needs of the college or of the individual student.

The colleges are now seeking a means of understanding the student better, so that instead of measures to compel him to comply with rules and regulations of the faculty, they may enlist his active participation in his own education. Attention has been given to the gifted student; to the probationer; to the student who has an excellent intelligence score but whose achievement does not measure up to expectation; and to the

[1] The original report on the establishment of the Student Consultation Service at Ohio State University appeared in this JOURNAL under the title, "Maladjustment among College Students," by Zoe E. Leatherman and Edgar A. Doll, Vol. VIII, No. 4, December, 1924.

physically handicapped student. The maladjusted student, whose emotional development is confused or retarded by various environmental or inherited factors, is just beginning to attract our notice. "These problems are not within the scope of the physical department," says a New York university professor in a letter sent out to colleges, "the discipline committee, or the scholarship committee though, in the main, the students are potential candidates for such. The medical staff have all they can do without attacking these minor psychiatric cases. The students themselves are not looking for medical advice. Some have been to a medical doctor, only to find that a doctor of philosophy would have served just as well."

At the Ohio State University an organized attempt to study the emotionally maladjusted student has been in progress since 1923. It was felt advisable recently to attempt some evaluation of the results achieved in the first five year period. In presenting the report of this investigation, it has been thought best to preface it with a brief account of what other colleges are doing in a similar direction, to state in a few words the methods that have been employed, how these were modified as the work progressed, and to indicate the direction in which further activity is suggested. It will obviously be impossible to include the full report in the compass of this article. Consequently the attempt has been made to select those items of most general interest, reserving the bulk of the material for publication in connection with a monograph later.

II. HISTORY OF THE MENTAL HYGIENE MOVEMENT IN THE COLLEGES OF THE UNITED STATES

The present interest in the mental hygiene of the college student as well as the tendency to adopt personnel procedure in dealing with his problems may well be said to have had their initial impulse in the mental testing movement. Beginning with the early work of Weber and Fechner in measuring the relationship between mind and body, following the development of tests down through the period until the World War, it is difficult to distinguish between the work of experimental

psychology and that of mental testing. The difference seems to lie in the use made of the data. The first recognition of the need for examining individuals for the purpose of giving them vocational guidance was the establishment of the laboratory in the South Kensington Museum by Galton in 1882. In this country, Cattell, a pupil of Wundt, has given us our first series of mental tests, in 1890. Cattell followed Galton in "combining physical measurements with psycho-physical and strictly mental tests."

Intelligence ratings for adults were first developed on a large scale in the United States Army testing in 1918. This was followed by a period of intensive testing in colleges, especially in connection with the problem of admission, and classification. A summary of the results of college mental testing up to 1920 shows:

1. The correlation of the physical with mental measures.
2. The production of a variety of tests for measuring various abilities.
3. The determination of college, class, and group medians for the purpose of comparing the ability of various groups.
4. The use of the ogive or percentile graph to express the results of the tests.
5. The discovery of the low correlation between test scores and academic grades.
6. The discovery that other factors than low intelligence may cause academic failure.
7. The beginning of the administrative use of test results.

Shortly after 1920 in various colleges steps were taken in the direction of establishing personnel work of some sort with students, using the earlier test results as one method of ascertaining individual differences. It is impossible at this time to say with certainty which school was actually the pioneer in this field. Probably as is the case with so many new methods, it began practically simultaneously in a number of institutions. It is certain that by 1925 a conference at Washington, D. C., had reports from twenty-two institutions relative to projects proposed or under way in this field. These were classified as follows:

1. Projects relating to the administration of Personnel Service in the colleges.
2. Examination methods.
3. Vocational counselling.
4. Personality traits.

As one outcome of this conference a study of fourteen institutions was made possible by a gift from Mr. Rockefeller, Jr. As a result of this study attempts are now being made to standardize college personnel procedure and the records in use at the various schools.

The mental hygiene aspect of personnel work has been given consideration by a number of groups of workers but especially has it been the concern of the National Committee for Mental Hygiene. Vassar, Dartmouth, Yale, Minnesota, Northwestern, West Point, Iowa, and Ohio State Universities have been among the first to attempt a comprehensive program of work with the problem student. No attempt is made here to enumerate all the places where excellent work is being carried on. Merely a few of the outstanding experiments are mentioned, but the reader is referred to a bibliography of 471 titles for the details of other investigations.[2]

At the Ohio State University the study of the maladjusted student was a normal outcome of the growth of the Psychological Clinic which was established in 1914. Students began to seek psychological aid of their own accord until the work assumed such proportions that an investigation of the nature of student problems was undertaken as a Master's Thesis in 1924 by the author. The cases presented such a variety of problems of such seriousness that provision for their care seemed essential, so the Student Consultation Service was established in the fall of 1925 with the author handling the cases of the women students, and Dr. Mervin A. Durea those of the men students.

All consultations have been voluntary. Individual students are often advised to consult the clinic by members of the university staff but this is not mandatory. The number of

[2] Ohio College Association Bulletin, No. 50, "The Maladjusted College Student, A Bibliography," by Zoe E. L. Stogdill, Ph.D.

consultants has steadily increased, the influence of the point of view has spread among students and faculty. A number of off-campus cases of adolescent maladjustment also is referred each quarter by parents who have in some manner heard of the service offered. The growth of the demand for assistance has been gratifyingly steady. In the summer of 1928 it was felt that some attempt should be made to ascertain what results had been secured with the earlier consultants, what was their opinion of mental hygiene service such as they had received, and what suggestions they would make as to the further development of the work. For this purpose letters were sent out and the replies were carefully studied.[3] Section four of this report deals with these in some detail.

III. THE PURPOSE AND METHOD OF THE STUDENT CONSULTATION SERVICE AT THE OHIO STATE UNIVERSITY

Before turning to the results of the letters it might be well to say a little about the purpose and method of the local clinic. The purpose of its establishment combined the two-fold aim of research and service. The service aspect has at all times been the chief consideration, the more so because there has been firm conviction that data on the complex social behavior of any individual is of value only to the extent that it is secured under natural rather than under strict "laboratory conditions."

In adhering to the decision to put the practical first, the inadequacy of some of the traditional procedure has become very apparent. The numerically evaluated rating scale while having value for some purposes has not proved as helpful in this instance as the "anecdote" method of describing the situation and recording what the student actually did in it; *understanding* rather than *classifying* has been the goal.

The method of approach to the problems of the maladjusted student has been an individual one. As far as it is possible to

[3] (This material was presented as a part of the author's Ph.D. dissertation.)

describe what was done in terms of already established techniques, the procedure has been that, mainly, of clinical psychology. Personal interviews, case methods, standard tests and inventories, analytic procedure, and such other methods as seemed appropriate to the individual situation have been employed. No one theoretical position has been adopted, but the practical consideration as to whether this procedure would produce the desired change in attitude or behavior has at all times been the deciding factor in the methods employed.

Students frequently express resentment at being treated impersonally by members of the faculty. This impersonality is not always because of deliberate intention, but whether it is or not the result on the student is likely to be the same. Being merely a "name on a card" does not make for much humanity in education No one other commendation of the Student Consultation Service is so frequent as "It is certainly splendid to discover some one who will just sit down and talk to me and try to see my point of view." The student's need of being understood is paramount. It is not enough merely to provide officials whose willingness to do the work is their only asset. The student must be able to find actual help, not merely someone who sentimentalizes over him.

That lack of intelligence is not the chief cause of maladjustment is shown by a review of the first 187 cases consulting the clinic. The 87 probationers in the group had a median percentile on the University Intelligence Test of 25, while those consulting because of other maladjustments showed a median ranking of 60, the average for the entire student body being the 50th percentile.

Maladjustment means faulty adaptation. This consideration puts us in an entirely different frame of mind toward the student's problems than if they were thought to be due to willfulness, laziness or even some mild psycho-neurotic disturbance. We can take a far more objective attitude in the whole problem of restoring him to normal university adjustment if we think of it as a matter mainly of emotional re-education.

IV. WHAT THE REPLIES TO THE FOLLOW-UP QUESTIONS INDICATE AS TO THE RESULTS OF THE WORK OF THE STUDENT CONSULTATION SERVICE

A number of criteria might be applied to the results secured by the Student Consultation Service in an attempt to evaluate its work in an objective manner, but the nature of each case would necessarily determine to a great extent which of these would be meaningful. For this reason it was decided to ask a few simple questions of all former consultants whose addresses were known (omitting the cases still pending) and to see what conclusions could be drawn from any answers received. Examples of these questions follow:

1. What do you consider to be the most serious problem you met in your college life?
2. From what sources did you receive help in solving these problems? (Name specific books, agencies, classes, persons.)
3. Did you notice any marked change in your behavior or attitude toward school or life after you had consulted the Consultation Service?
4. Have you, since this consultation, been able to meet successfully conditions in which you had been unsuccessful before that time? (Give detailed reply.)
5. Has the assistance thus received made any permanent change in your outlook on life? (Be specific.)
6. Do you believe that colleges should have on their staff a consultant in mental hygiene doing work similar to the Student Consultation Service referred to above?
7. Make any comments you wish, whether constructive or destructive in regard to mental hygiene work among college students. Use as many extra pages as your reply calls for.

The individuals who replied were representative of the usual type of problems seen by the consultant. Serious problems of all sorts were named as having been met in the college lives of these individuals from finances, academic and vocational problems, personal adjustments to limiting environments. Family situations of all sorts, actual psychiatric depressions, temptations to suicide, to crime, and to other anti-social behavior not easily classifiable because of its individual setting, were mentioned.

As sources of help, various persons and agencies were listed, Student Consultation Service being given very frequently. Books and personal friends constituted the bulk of the agencies next in order of frequency. There was some mention of ministers and campus religious workers.

The statements made about the results of the work in individual cases were most encouraging. Progress or entire solution of specific difficulties was the claim made by almost every report. A number said that although their difficulties persist, the assistance they received has shown them the method of seeking the final adjustment which in the nature of the case is a matter requiring some time to accomplish. A number claimed that they have been able to give assistance to friends or associates because of the insight received in attacking their own problems. Improved academic standing has resulted in many instances.

Some had noticed a marked change after consulting the clinic. A number reported that the change was more gradual, but just as real. A few stated that no change had been apparent, but in reading the rest of the answers on these papers and comparing them with earlier case material this was felt to be a decided understatement of results due perhaps to the difficulty any individual experiences in estimating his own development.

A number stated that they had been able to meet successfully conditions in which they had previously failed. Most of these went into rather elaborate detail to prove the statement.

As to whether the consultations had made a permanent change in their outlook on life, many guesses were hazarded. The thing of interest is that the tone of these replies was free from emotionalism, a thing which would in practically no case have been true at the early consultations. This furnished a very interesting objective measure of results.

Without exception those who answered the question regarding the employment of a mental hygiene consultant in colleges said that they heartily endorsed such a plan and expressed themselves rather extensively as to what such an organization had meant to them.

The good points mentioned about mental hygiene clinics centered around the feeling of relief at having some one take time to see the student viewpoint; and the discovery that there is a rational explanation for the emotional conflicts from which students suffer.

Some suggestions were made as to modifications of procedure, the usual one being that better methods for bringing the service to the attention of more students should be devised. (Because of the experimental nature of the investigation the clinic has to date sought to avoid having an undue press of cases until the preliminary investigation should be completed.)

The comments should be read to be appreciated. Some gave detailed suggestions for the arrangement of the office, for getting into touch with more students and at an earlier date in their college life; others mentioned possibilities of more complete integration with other campus agencies. On the whole, the comments were intelligent and very constructive. No insurmountable obstacles have appeared although many details of organization, method, and approach are yet to be worked out.

Some of the desirable developments to which we look forward in the future in our work at the Ohio State University are:

1. A system of centralization of personnel records for every student on the campus.
2. More adequate facilities for medical research at a nominal cost to the student (this in addition to our present very excellent Student Health Service).
3. Better contact with the homes from which our students come, in order that their present attitudes may be better understood. It is also important in the cases of those students who drop out because of ill health or nervous conditions to have established a previous contact with the parents so that follow-up measures may be recommended with some certainty that they will be carried out.

V. SUMMARY AND CONCLUSIONS

The conclusions reached as a result of the investigation of the work of the Student Consultation Service of the Ohio State

University, and a survey of the methods in use in other colleges may be summarized as follows:

a. Severe entrance examinations, rigorous elimination of students who fail to measure up to a certain standard of educational achievement, stricter requirements regarding class attendance, longer examinations, more required work, medical examination and physical health service, disciplinary measures, and all other measures intended to compel the student to comply with faculty regulations have failed to enlist the active participation of the student in his own education. Without such student coöperation education in the true sense of the word is impossible. A diploma secured under such conditions has far less value than it should have.

b. During the past ten years universities have begun to experiment with other means of motivation than those just mentioned. The name of the agencies employed to accomplish this varies in the different schools as do the measures employed, but the underlying principles are similar—an attempt to study the background of the student; to determine his educational and vocational interests, if any; and to guide him in securing what he wants, or to inform him as to vocational possibilities so that he may develop a desire to enter some field of activity. This is variously known as Educational or Vocational Guidance, or Personnel Service.

c. Educational Guidance, Vocational Guidance, Personnel Service all may take some account of the emotional adjustment of the student, but while this is good as far as it goes it stops short of meeting the needs of the student body.

In addition to these services, there should be on every campus an agency primarily concerned with the emotional problems of the individual, his personal adjustment to his life situation, to his emotional needs, and to his preparation. This service is intimately related to educational and vocational guidance, but it is neither.

d. Educationally as well as personally this clinical method is of the greatest importance. It not only solves the immediate problem of the student but it establishes in his experience an

exceedingly valuable precedent of a *thoughtful* rather than an *emotional* approach to his own difficulties. It teaches him to distinguish between *rationalizing* and *real thinking*. It brings him this valuable information when by reason of his very difficulties he is in the most receptive state of mind possible. He really wants help or he would not seek the clinic. Here is motivation which the ordinary class room rarely, if ever, achieves. As a result, students frequently make the comment, "I have learned more in the past two hours of consultation than in all my college course so far" or "I begin now to see what college is all about." It is impossible to overstate the implications for educational theory that are inherent in the method of fitting the information to the student's individual need at the time when he is acutely conscious of it. This is where this work links up with probation and other disciplinary methods. In coöperation with these means of making a student feel his shortcomings, the clinic can help him to realize the purpose of education, and its application to his individual situation. Without someone to interpret it any disciplinary measure may do more harm than good, either by rousing a feeling of resentment or one of desire to be different, without furnishing the student an adequate and constructive outlet for either emotion.

DIFFERENCES IN THE TALENTS AND ABILITIES OF YOUNG PEOPLE[1]

CHR. HANSEN-TYBJERG

Copenhagen, Denmark

The Tests mentioned in this Treatise began in 1924, the writer, as Chairman of the Association for Experimental Pedagogics, Copenhagen, having proposed to the Association of Master Printers of the latter City to put the young people who desired to become apprentice printers or compositors through these Tests. The preparatory tests were held partly in Copenhagen University Laboratory for Applied Psychology, whose principal Dr. R. H. Pedersen took some part in the initiatory work, and partly in one of the larger Board Schools. Since 1925 the Tests have been official and held under the supervision of the Copenhagen Association of Master Printers, and the Chairman of the Commission which judges the apprentices' work, Mr. Holger Meyer, Printer and Publisher, who has participated in the daily work and been present at the judging of results.

Including the Preparatory Tests, which extend over six months, in all 238 apprentices have been examined to date. Owing to lack of space all particulars of these Tests cannot be given here but we have chosen two series of Tests, one from the preparatory and one from the official in order to see if the results were consistent.

The test an apprentice compositor has to submit to was setting and laying out each day for four days (during the preparatory examinations, however, five days), Dictation, Manu-

[1] Teachings of the Official Psycho-Technical Tests held by The Association of Master Printers, Copenhagen. Subsided by the Raskorsted Fund.

script Reading, Proof Reading, Memory Test, Advertisement and Title Setting and Arithmetic.

Let us now pass on to the individual tests.

SETTING

A type case, constructed by Dr. R. H. Pedersen, was, with some few alterations, employed. This case consists of 24 compartments in which are the letters of the Alphabet printed on small pieces of cardboard 1.5 by 2 cm. in size, all A's in one compartment, all B's in the next, and so on.

The mode of procedure has been as follows: A piece of printed matter is chosen. Six apprentices place themselves at the respective cases. The first time they are allowed to set up a piece without time being recorded and in this manner they become acquainted with the apparatus, thereby giving proof that all have understood instructions. Then the command "Ready" is given and the letters replaced in the compartments destined for them. When everything is in order and the minute hand of the watch points exactly to one of the black lines on the face showing the hours, the command "Begin" is given. They set up for exactly ten minutes at a maximum speed, being enjoined, however, to try to avoid mistakes. On a board with cardboard lists pasted thereon is set up one line after the other in such a way that the cardboard pieces with the letters project a little over the cardboard lists above and are, thereby, easy to get hold of during the laying out.

As aforesaid, they set up for ten minutes daily. We have preferred to fix a time instead of appointing a certain piece to be set up. Hereby, we gain the advantage of being able to determine by the letters how much work each can perform, whilst if a certain piece were laid down it would be necessary to reckon with fractions of minutes for the execution of the work, and, thereby, less accurate results.

After the lapse of exactly ten minutes "Stop" is called and all cease immediately. By means of a key-list, which is arranged so that it can be seen how many letters have been set, as according to where they were stopped in the piece, it can

easily be determined, if, by inspection of the board one has assured oneself that none of the pieces has been skipped over, how many letters have been set. The number, along with any possible mistakes, is then entered into the register.

When this work is concluded the laying out begins.

The apprentices are not allowed to lay out direct in the compartments of the type case as they may easily commit mistakes and thus cause errors in the work of the compositors who follow after.

Long cardboard covers are placed over the type case compartments. These covers are divided into compartments corresponding to the type case compartments and on them the laying out takes place. After this an inspection of the letters is made and faulty laying out rectified, thereupon the letters are poured into the type case compartments and a fresh test in setting up can take place. Each test in setting up and laying out and the correcting appertaining thereto takes about half an hour.

When an apprentice has set up a long piece he must, of course, have a correspondingly long time for laying out and the individual apprentices cannot all accomplish this in the same time. On finishing his laying out he notifies this by raising his hand and the time he has taken is noted. If the time taken over each lay out is noted and also how many letters have been laid out each time it is easy to find out how many letters have been laid out on an average per minute. In setting up it is calculated how many letters are set up on an average in each period of ten minutes.

It will readily be understood that setting up is far more complicated work than laying out. The apprentices have to read from the piece, grasp the pieces of cardboard in the compartments—where they lie among a number of others—they have to twist and turn them in their fingers in order to place them correctly on the board before them.

During this work it appears clearly whether an apprentice has talent for the printing trade or not. Some have supple and flexible fingers and easily manoeuvre the letters, others have

fingers which are all thumbs and either have difficulty with the letters or drop them.

In judging an apprentice's ability as a compositor we almost exclusively take into consideration his talent for setting up. The figures for laying out can, of course, sometimes modify one's decision.

THE RESULTS

From the following tables will be seen the results of the unofficial examination of sixty-five boys. Each set up five times and the figures state the number of letters set up on each occasion. It will be noted that there are wide margins. The best set up, in all, 1019 letters, the worst 549 or about half.

It is quite common in examinations of this kind to arrange the results according to excellence, beginning with the best. The material is then divided into four lots and the average taken for each. This method we shall use here. As there are sixty-five candidates we shall allow seventeen apprentices to the nethermost fourth part.

We then get as a result the following:

1st Section set up 14,576 letters or 911 letters per pupil
2nd Section set up 13,096 letters or 819 letters per pupil
3rd Section set up 11,964 letters or 748 letters per pupil
4th Section set up 11,090 letters or 652 letters per pupil

Taking an average of the whole group 780 letters per head were set up.

THE EFFECT OF PRACTICE

If we subject the whole of the material in itself to an investigation to determine the rate of progress from one setting up to another we find that from:

1st to 2nd is an advancement of 1,668 letters or 21 per cent
2nd to 3rd is an advancement of 812 letters or 9 per cent
3rd to 4th is an advancement of 782 letters or 8 per cent
4th to 5th is an advancement of 689 letters or 6 per cent

From above it will be seen that the greatest progress is made from the 1st to 2nd setting up and that it declines in each of the ensuing. The rate of progress per cent is 3½ times as great in the second as in the fifth and as same steadily becomes less there is no reason to believe that the apprentices will cause surprise by unsuspected proficiency. They have attained full mastery over the material, the rest of their progress will, presumably, be due to continued mechanisation of their movements.

Another matter which it is of importance to investigate is as to what is the position within the various groups of children: the well-talented, middling-talented, etc.

We find that the various "fourth parts" have set up the following:

	1st time	2nd time	3rd time	4th time	5th time
1st Section	2,323	2,766	2,950	3,139	3,398
2nd Section	2,010	2,524	2,661	2,896	3,005
3rd Section	1,812	2,210	2,471	2,624	2,847
4th Section	1,728	2,041	2,271	2,476	2,574

Progress from time to time is then the following:

1st Section	19%	7%	6%	8%	Average 10%
2nd Section	26%	5%	9%	4%	Average 11%
3rd Section	22%	12%	6%	8%	Average 12%
4th Section	19%	11%	9%	4%	Average 11%

Progress made by the two upper groups, after having overcome the initial difficulties, is very slight. The two lower groups have even at the third stage made considerable advancement which indicates that they need longer time to adapt themselves to the work.

There is no appreciable difference in the average per cent progress of the four groups. The various groups are merely on a different level and as the differences right from the beginning are so considerable that one can accomplish twice as much as the other, there is, unfortunately, not much prospect of the difference—at any rate as far as the upper groups are concerned

—ever quite disappearing, indeed there is even no prospect of the most backward ever attaining any normal degree of efficiency. Experience confirms this assertion. Master printers stated, on enquiry, the difference between an efficient journeyman and a poor one to be 25 per cent. If the former could earn 100 Crowns at his job the latter earned 75.

By this test we have attained considerably greater differences but it arises from the fact that no selection of pupils took place at all.

It is easy to conceive that it is nothing less than a disaster for a young person belonging to the lowest group to take up the printing trade. He will never, despite diligence, attain to ordinary efficiency, will always feel himself as an inferior, and will always be pushed aside in competition.

Let us now turn to the *Official Tests*. The reason why we have separated them from the unofficial is that they are made under other outward circumstances. The unofficial are made in a municipal school after the children have finished their school work. There might, therefore, be reason to expect that especially fatiguing school work could have had an effect on the tests, however, the figures indicate differently. The official examinations entail, naturally, some tension though no impression is given at all that the apprentice is nervous: they display the same cheerfulness as under normal conditions.

During the official tests the apprentices have set up four times on four successive days. From the tables it appears that the well-talented have set up 850 letters and the worst 367. The best have, therefore, set up 2½ times as quickly as the worst. Moreover, the tables show that sixty-five of these boys—there are seventy in all—have set up in four days 38,368 letters while the sixty-five boys during the unofficial tests set up 38,902 letters. The difference amounts to eight letters per pupil or two each time, which is a quite insignificant difference. The results of the two series of tests therefore correspond exceedingly well to each other and show that the apprentices have really strained every nerve.

The seventy boys set up the following numbers of letters:

1ST TIME	2ND TIME	3RD TIME	4TH TIME
8,703	9,943	10,458	11,297

Progress from 1st to 2nd stage is 1,240 letters or 14 per cent
Progress from 2nd to 3rd stage is 515 letters or 5 per cent
Progress from 3rd to 4th stage is 839 letters or 8 per cent

The per cent progress from the 1st to 2nd setting is here considerably less than during the unofficial tests, viz., 14 per cent against 21 per cent, but, for the rest, agree with the unofficial in the fact that advancement is great in the second setting up and becomes much less in the ensuing. It would seem as if the apprentices "got steam up" much quicker during the unofficial tests.

Another thing which strikes one: the remarkable finishing spurt at the last test. Here, where something was at stake, the results have been improved slightly. If, however, the results in their entirety are below those we attained at the unofficial tests it arises from the fact that the apprentices have shown more caution, have been more afraid of setting wrongly.

In the final judging of an apprentice's ability it is, of course, of no consequence whether he has one letter more or less at the finish; the determining factor is whether he has all the time been on a high level or a low one, in other words whether he is endowed by nature with rapid reactionary ability or slow.

If the best set up about twice as much as the worst then there is no need to be too petty in judging. The scope is sufficiently extensive.

We find that the per cent progress was the following:

	1ST TO 2ND SETTING	2ND TO 3RD SETTING	3RD TO 4TH SETTING	AVERAGE
	per cent	*per cent*	*per cent*	*per cent*
1st Section	13	8	9	10
2nd Section	13	4	7	8
3rd Section	16	4	8	9
4th Section	16	4	7	9

Particularly in the last three sections is a finishing spurt perceivable.

We will now leave this subject by establishing firmly that *roughly calculated, the best pupil has, during the first series of tests, proved to be twice as quick as the slowest, in the other essays the best was 2⅓ times quicker than the worst, while in both series the top section set up about 1½ times as much as the lowest.*

LAYING OUT

In this case it is not our intention to go so closely into details as in the setting up. As aforementioned it is not nearly so important in the judging as setting up.

From the tables it appears that the best apprentice has, on an average, laid out forty-seven letters per minute, the worst twenty-three. *Here too the quickest perform twice as much work as the slowest.* The achievements within the various sections are the following:

	Letters per minute
1st Section	41
2nd Section	37
3rd Section	34
4th Section	29

The average is thirty-five letters per minute.

We will now pass on to tests of knowledge and other mental tests and begin with:

ORTHOGRAPHY

It is a matter of course that apprentices wishing to take up typography must be, to a certain extent, sure in spelling. This is of the greatest importance not alone when reading proofs but also during setting up because it would be impossible to see how the author has spelt each word if any speed at all is to be maintained.

The typographers are set two orthographical tests. One consists of a rather long piece, a story; the other a number of independent sentences containing words that pupils who are

uncertain in their spelling may easily mistake, words with mute "d," soft "g," words containing double consonants, and the like. All are common words and of Danish origin. In the first piece of dictation the apprentices must place all punctuation marks except the period, which is dictated. All errors in the two pieces of dictation are added together: three mistakes in punctuation are equal to one mistake in spelling, a method of judging common in examinations held at municipal schools.

It will be readily understood that it is not quite easy to write two long pieces of dictation without mistakes, nor is this the intention. The object is to see how much the pupil knows and this problem may be said to be solved if we regard the results of the official examinations.

The average number of mistakes for the various sections is:

	1925	1926	1927
1st Section	6	3	5
2nd Section	11	7	12
3rd Section	22	14	20
4th Section	57	26	41

As it will now be seen, the problems give a particularly good "dissemination" and it is not a difficult matter thereafter to give marks. We employ the ordinary school method, viz.: 6 minus, 6 plus, 5 plus, and so on.

As a singular case and as proof of the importance of these tests, it may here be mentioned that the last but one in the first batch—the apprentice with the 112 orthographical errors—had, before the test, obtained a situation with a printer. We, of course, found him impossible, a decision the master himself very quickly came to. This shows the folly of taking the first that offers.

READING

In the above test the apprentice is given two pages of manuscript, one a little more difficult than the other; these two pages he copies and should there be a word he cannot read he places

a stroke where the word in question should have stood. A written test we have found much better than an oral; the apprentices have time to consider and are saved a good deal of nervousness. Finally, this examination takes less time and can easily be held between other tests.

The apportioning numbers of mistakes within the various sections is as follows:

	1925	1926	1927
1st Section	2	1	3
2nd Section	4	2	10
3rd Section	8	5	18
4th Section	21	10	33

As will be seen, the dissemination here too is good.

PROOF READING

Here the apprentices receive two pages of printed matter, alike in substance. One contains no mistakes while in the other a good few are concealed; these must be corrected—in pencil—by reading through the faultless page. This test is really, in the main, a test of observance. Time must be taken over it but is not of such great importance as faultless work.

In the judging we, therefore, take due regard first to the number of mistakes overlooked and then, to some extent, to the time taken.

In 1925 the best pupils had no mistakes, the worst thirteen. In 1926 the best had no mistakes, the worst seven, and in 1927 the best had no mistakes, the worst twenty.

MEMORY TESTS

That a typographer should have a good memory needs no comment here. He is, thereby, not alone saved trouble by often looking at the manuscript but also during the laying out when he has to move between the various type cases a good memory is of immense value.

In memory testing we employ broken sentences such as are to

be found in any book. The sentences are printed on long strips of paper, one sentence on each, and become longer and longer. In all six are used. They are held up before the apprentices for a few seconds and then removed after which they must write down what they have remembered. It is impressed upon them that everything depends upon a good reproduction word for word. A typographer must, naturally, remember word for word what he has read: it is of no use his remembering a word here and there in the sentence. First and foremost everything depends upon a good memory and one of sufficiently extensive compass.

The problems being uniform year by year we can very well combine the series here. From the tables we get the following results:

	NUMBER OF SENTENCES CORRECT	NUMBER OF MISTAKES IN REMAINDER
1st Section	4	7
2nd Section	3	10
3rd Section	3	17
4th Section	2	23

The average is about three sentences correct and fourteen mistakes in the remainder. As a whole this memory test separates the boys very well and with a little care it is not difficult to place them in the various groups.

SETTING UP OF ADVERTISEMENTS AND TITLES

It is, naturally, of great importance that a compositor possesses so much good taste and ingenuity that he is able to produce a conspicuous and at the same time tasteful advertisement. In order to test the apprentices in the above we have set the following problems:

The first consists in producing an advertisement card for a taxi-cab proprietor. In the apprentices' holders are cards along with an advertisement printed on a piece of paper in two letter sizes and with accompanying illustration. The ad.

is printed without prominence of any kind, being merely set out in one piece. With this material to work on the pupils have now to compose a smart ad., give prominence where called for and arrange everything in an elegant manner. A few instructions are given. They must peruse the ad. thoroughly, think to themselves how such can be set up, and print in heavy type the words they imagine people will specially notice. Next they clip out the words and the illustration arranging all loosely on the card, adjust them till they find everything to their satisfaction, then, finally, paste them to the card. Many manage this task neatly, emphasize correctly and show a talent for arrangement.

The next problem is setting up on a ruled piece of pasteboard representing the lower part of an invoice form, a "Heading" consisting of the man's name, residence, telephone number, and the nature of his business. All this is printed beforehand on a piece of paper which the pupils receive. They cut out and arrange as in the former case. This task is considerably more difficult than the previous one.

The third problem is to arrange on a piece of pasteboard the width of a newspaper column, an ad. printed in two sizes, emphasize correctly, keep within the space allowed and endeavour to avoid the breaking up of words. This, too, is considered difficult.

The final task is to set up on a piece of cardboard of octavo size a title leaf for: "H. C. Andersen's Fairy Stories, Popular edition, 2nd publication, Copenhagen 1887. Reitzel's Publishing House." The title was printed in three various sizes.

As judge of the apprentice's work the chairman of Supervisors, Mr. Helger Meyer, has always acted. Last year the pupils had even to compose a title from "cut out" words.

In addition to the tests mentioned the pupils are set three problems in arithmetic to test their ability in and knowledge of vulgar fractions, percentages, and proportion. One of the problems was a question of calculation. The judging of these is, of course, partly founded upon an estimate but as it is the same people who have judged them year after year, there is

probably some sense in it. Marks are given to the various sections in the following manner:

Production of advertisements and titles

	1925	1926	1927
1st Section	6	6	5
2nd Section	5	5	5
3rd Section	5	5	5
4th Section	4	4	4

Last, but by no means least, the pupils are subjected to an interview, all their mark books and testimonials examined and a summary thereof entered into the register.

The mark books mean a lot. At the back are the results of six annual examinations and should a book be full of the figure six it practically means that the pupil has been clever in school subjects and, very probably, diligent. Diligence, however, is a splendid quality to posses in the printing trade.

The testimonials must be read critically. Almost everybody can obtain a testimonial but there is usually a difference in the warmth with which they are recommended. In some instances one gets a firm impression that the writer has really had the welfare of the person he recommends at heart while in other cases the terms used are more indifferent and ordinary.

In inspecting the mark books the question arises as to from which Class the pupil left school: 6th, 7th or 8th, or middle class school.

In our principal register, kept at the office of the Union of Master Printers, all particulars concerning each individual apprentice are preserved, together with the result of the examination. Finally, the whole may be summed up in the following important questions: "Rapidity," "Taste for Arrangement," and "School Learning," and we conclude with a general estimate of the pupil expressed in the terms: "Distinctly suitable," "suitable," "rather suitable," "scarcely suitable," and "not adapted." The terms are accompanied by an explanation

accounting for possible defects or advantages; being very circumstantial work we regard it as a very responsible task.

It is then up to the masters to choose the one they have the highest opinion of. After the apprentice has been in his position for a time, we enquire of his master how things are going. We have usually found that our estimate and that of the master are in agreement.

TESTS FOR PRINTERS

Firstly, each pupil is subjected to a test in color-blindness and should it appear that he is completely color-blind he is not proceeded with any further.

If he passes this test he is given a box containing 25 small blocks of various shades of color. The first order given is: "Arrange the colors on the cards according to their basic color, viz.: red, blue, yellow, etc." The next order is: "Arrange the colors within the various basic colors according to strength, beginning with the faintest to the left and continue with the strongest to the right."

ADJUSTMENT TEST

This test, proposed and arranged by Mr. Holger Meyer, Printer, is to judge the clearness of a picture accordingly as they should be arranged. Three impressions are taken of a picture, one clearer than another. Which is the clearest? This the pupil must arrange according to clearness. Four problems are set in this test which may be said to be an excellent one for printers as it does not claim previous knowledge of any kind but simply a keen sense of ability to make distinctions, an ability of great consequence during the daily work in a printing shop. Not many complete the problems correctly; in 1926 only seven out of thirteen did so and in 1927 only twelve out of twenty-seven. A few slight mistakes, however, are of no great significance and the test is not taken so seriously as the color test. that is to say that they will come to grief over it. But this, as well as the others, serves to sift the good from the bad.

TEST IN PRACTICAL MECHANICS

A printer being regularly engaged with machinery it is desirable that he possess so much practical sense—sense of mechanical construction—that in time he can become acquainted with the working of the machine at which he labours. He will then be better able to look after it and, perhaps, better able to surmount slight mishaps. It is, of course, out of the question to confront pupils with the ordinary printing machinery, which, as is well known, is very complicated; on the other hand it is possible to place them before some small mechanism or other and let them try to make something out of it.

We have the following five: a cycle bell, a detector, an ordinary lock, a free wheel hub and a complicated door lock. These problems are very popular with the boys who display much ingenuity in solving them. In 1926 of thirteen pupils two had two mistakes and six one mistake. In 1927 of twenty-seven pupils two had two mistakes and five only one. This indicates that the problems are too easy but we have not thought it fit to make them stiffer. The pupils are not going to be mechanics but simply need to be in possession of ordinary, common human intelligence to understand what is required in this sphere.

COMMON SENSE QUESTIONS

In addition to the foregoing tests the apprentices have eight drawings of mechanism or machinery as follows:—A screw jack, a boiler with safety ventilator, a "starter," various pulleys, a water cock, an electric bell, a pressure pump, and a perforating press. The question will probably be asked: what has all this to do with printing? The answer is that it is not a matter of testing the pupil's knowledge in the physical or mechanical sphere but of testing their intelligence and for this purpose the drawings along with the accompanying questions have proved eminently suitable. To give an idea of the questions we will here mention those attached to Problem No. 1:

The picture shows a screw-jack (hand worked) used for raising heavy weights.

1. Which wheel revolves quickest.

2. Which wheel revolves slowest.
3. What is "G" for (the brake).
4. What is "H" for (spring keeping brake in position).
5. If the weight is to be lowered down what must be done with "C."
6. When the handle is turned in the direction of the arrow does the load go up or down.
7. If arm "A" is longer should more or less power be employed.

It is the pupil's ability to feel his way into the working of the machinery, to think over the construction without jumping to conclusions, we wish to test. There are, in all, sixty-one questions connected with mechanism so that the result arrived at does not depend upon chance. The replies are written so that the pupils have sufficient time to think over them. In their exercise books they simply write the answers to questions 1, 2, 3, etc., in problems 1, 2, 3, etc., respectively. Below are the results of 40 pupils' replies. Mistakes are all added together.

ANSWERING OF COMMON SENSE QUESTIONS (40 PUPILS)

From the tables we get the following results:

	Mistakes on an average
1st Section	9
2nd Section	16
3rd Section	22
4th Section	30

In above we have not included the pupils whose replies were hopeless. It may, perhaps, be thought that the 1st section are somewhat high up with an average of nine errors but as there are eight problems it works out at an average of one mistake per problem and as there are many questions in each problem, as stated sixty-one in all, it is not too strange that some few mistakes slip in. The best had four mistakes and the worst of those we reckon with had thirty-seven. It will be noticed that these problems separate the boys exceedingly well and we have more confidence in this kind of test than in the usual so-called intelligence test as for instance filling in gaps in a

piece of matter. It is not at all sure that because a pupil can pass this kind of test he can discover how a machine acts.

TEST IN PERSPECTIVE DRAWING

In addition to all the said tests printers must also undergo one in above. They have to draw a tower with gable ends on each side and a ridge turret in the centre. This is not quite easy for the pupils to do. Marks vary between 6 and 3 and the distribution to the various sections is the following:

	Average
1st Section	5
2nd Section	4
3rd Section	4
4th Section	3

Finally, the printers have dictation with placing of punctuation marks, three arithmetical problems, and a memory test. Besides, they receive marks for neatness in their written tasks, are subjected to an interview and have their mark books and testimonials examined.

That there is also a difference regarding the latter test may be seen from the following statement of marks in arithmetic given to compositors and printers.

	COMPOSITORS		PRINTERS	
	1926	1927	1926	1927
1st Section	6	6	6	6
2nd Section	5	5	5	4
3rd Section	5	4	5	3
4th Section	4	3	4	2

Marks for neatness range from 5 to 3.

In common with the compositors the printers are examined on four successive days. When all the pupils are kept going a good deal can be accomplished. There are three gentlemen to hold the examinations and each has his own particular work to do. All have prepared themselves down to the most minute detail prior to the examinations otherwise it would not do.

And what does one see from all these examinations? Well, gradually, a picture is formed of each individual apprentice. This picture shows us that he is in possession of a sense of color, is able to distinguish between clear and less clear prints, possesses practical intelligence, is orderly in his affairs, has been diligent at school, has a good knowledge of scholastic subjects and, therefore, we consider him to be adapted for the printing trade.

Finally, by means of our marks let us sketch a couple of profiles:

Apprentice "A" has the following marks: Spelling 6, sense of color 6, judgment of picture 6, mechanics 6, common sense questions 6, drawing 6, memory 6, neatness 5.

Apprentice "B" received the following marks for the same subjects: 0–6–5–5–3–4–3–3.

There is, undeniably, a difference but the best impression as to how great the difference is we get not by studying the tables but by observing the work and following the apprentice during the execution of same.

A 'CONCEPTUAL' BASIS OF HABIT MODIFICATION

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Twitmyer,[1] in 1900, lecturing in general psychology, for pedagogical purposes, presented the Types of Human Behavior schematically as illustrated in figure 1. The point of origin is Reflex (*R*), the simplest and first manifested form of behavior. The qualities and characteristics of the Reflex were thus easily explained. The organism being endowed at birth with specific neural organizations, this earliest behavior (recently shown to exist even in foetal life[2] with the reception of a stimulus there was set off the first demonstrable behavior (bodily movement). It was not difficult to develop from this point the concept of Instinctive Behavior. Despite the thesis of Kuo and others, the existence of the Instinct, as such, when accepted in the light of modification, delayed performance, complexity and as a basis for the development of certain biologically important memorial imagery via the route of the "backstroke of consciousness" is still acceptable, unaltered, as James's "a priori neural synthesis."

It is in terms of these two definitely consciously sub-liminal types of behavior that the criminologist, social worker, and

[1] Edwin Burkett Twitmyer, Professor of Psychology, University of Pennsylvania.

[2] Minkowski, M., Sur les mouvements, les reflexes, les reactions musculaire du foetus humain de 2 a 5 mois et leurs relations avez le systeme nerveus foetal. *Revue Neurologique*, 1921, 37, 1105–1235.

Minkowski, M., Ueber früzeitige Bewegungen, Reflexe, und müskülare Reaktion beim menschlichen Fötus und ihre Beziehungen zum fötalen Nervenund Muskelsystem. *Schweiziger medicinische Wochenschrift.*, 1922, 52, 721–751.

those others interested in the problems of modifiability of response make their diagnoses and prognoses. Undoubtedly the need for such theoretically satisfying instruments for behavior dissection gave the impetus or at least supplied the momentum

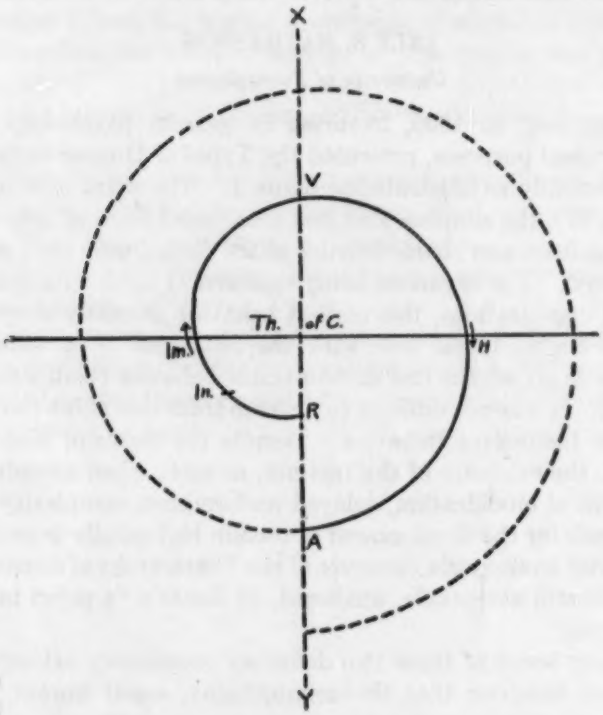

FIG. 1. FIGURE EMPLOYED BY TWITMYER FOR SHOWING TYPES OF HUMAN BEHAVIOR

R, Reflex; *In*, Instinct; *Im*, Imitation; *V*, Volition; *H*, Habit; *A* Automata; *Th of C*, Threshold of Consciousness; *X-Y*, Vertical Dividing line.

which carried forward the "blunderbus" explanations so smugly promulgated by Max Meyer, Weiss, Watson, Tolman, et al.

Even in 1900 at the time Twitmyer was presenting this schema of human behavior, G. Stanley Hall was concerning

himself with the "sub-conscious" and the writings of Janet had already appeared supplemented by the presence of a mythical functioning censor, the product of the pen of Freud. About this time also there was being heard the names of Thorndike and Yerkes interested in animal experimentation. These were departures *ex cathedra*, as it were, from the substantial and fundamental concepts of that day. Functionalism was inquiring through the mouths of James and Angell as to the "why" and "function" of consciousness while Titchener was carrying forth the doctrine of Structuralism, striving for answer to Wundt's problem of the analysis and description of conscious processes. There was necessitated the establishment of a consciousness and non-causative consciousness divisions of behavior. Notwithstanding these varied approaches to the study of consciousness, as such, it was possible to make a grand division of human behavior into the two catagories of (*a*) a directive conscious type and (*b*) a non-causative conscious type. This threshold or limen was arbitrarily placed so as to include both by quantity and degree of complexity about one-third of all human performances in the consciously directed group and the remaining two-thirds below the threshold of causative consciousness.

Imitation (*Im*) was next considered. Imitation appears primarily below the consciousness threshold but also is to be found above it. This refers rather to the fact that while many of the acts of human behavior are "osmotic" in a sense, being absorbed by the individual from his environment, both in the case of children and adults there is also a certain element of purposeful consciousness which sets off and makes ready the organism to be receptive. Certainly this latter condition is valid as an explanation of the acceptance of modes of dress, speech, artificial social customs and stereotyped group behavior. And the existence of the neural "readiness" or "set," analogous to, or the referred physiological phenomenon of proprioceptive stimulus to muscles of the human organism in the matter of Reflex, Instinct and Imitation is indicated schematically by the line *X-Y* which divides Reflex, Instinct and Imitation and

beginning Volition; the basis for them being in nerve tracts that are innate as separated from complete volition, Habit and Automata the basis of which are in nerve tracts acquired during the life time of the individual. The figure illustrates the genetic arrangement of behavior by virtue of its ever increasing spiral

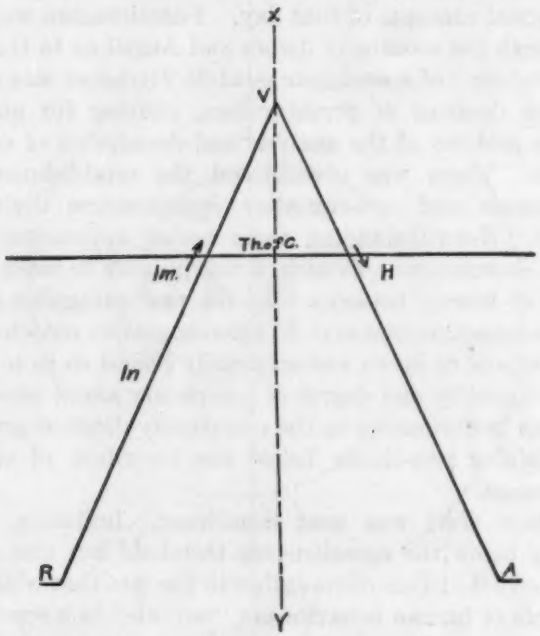

FIG. 2. FIGURE EMPLOYED BY FERNBERGER FOR SHOWING TYPES OF HUMAN BEHAVIOR

R, Reflex; *In*, Instinct; *Im*, Imitation; *V*, Volition; *H*, Habit; *A*, Automata; *Th of C*, Threshold of Consciousness; *X-Y*, Vertical Dividing line.

area. The schema of behavior there presented continues throughout life, just as in earlier life, habit formations are more readily strengthened, so also are habit modifications more easily accomplished. The conditioning processes are rendered more resistant as the spiral grows (as the area to be traversed

increases) a fact borne out by our knowledge of new habit formations in advancing years and the dropping downward evidenced in the curve of Myelination after forty-five years of age.

This "desire" or "set" for imitatory acts and their resultants is the concern of this paper. The performance thus begun, assisted by a directive consciousness, is thus lifted above the consciousness threshold into the fields of volition and remains there in the hierarchy of behavior, as dominant, purposeful performance until there develops a "short cut through consciousness (psychological)," or "there are involved lower levels of the nervous system (physiological)." The status of the performance is now consciously sub-liminal and is designated as Habit (*H*). The behavior Automata (*A*) at the base of our figure embraces those habits so highly mechanized as to be almost reflexive in character and spatially in our diagram so indicated. The differential being, of course, that the one is innate and the other acquired.

A few years later, Fernberger[3] made some changes introducing a new figure (fig. 2), the chief differentia being that Reflex and Automata were placed on the same level from point of view of complexity and removal from a high point of volition, rather than as in the figure used by Twitmyer, where the two likewise appear as points on the same line but the distance from consciousness is different. The other point of departure has been a pleasant controversy not more within the province of philosophy than of biology and is indicative of the interests of its protagonists. Twitmyer being a clinical psychologist and Fernberger an experimentalist they differ on the "continuum" of behavior, the former holding to the gradual merging of stages of life and mental process, while the latter draws a line of demarcation establishing a sharp break between the ascending and descending quantitatively and qualitatively varying conscious processes.

Such a "conceptual" scheme of behavior is acceptable and

[3] Samuel Weiller Fernberger, Professor of Psychology, University of Pennsylvania.

justifiable, satisfying the method of science: "(1) the observation and recording of phenomena; (2) the classification of the recorded phenomena into groups and series; (3) the discovery of a formula which will enable us to resume these series in the most comprehensive and convenient manner."[4] Then the final test of the validity of such a presentation resolves itself into the fact as to whether or not the employment of these principles can produce a predictable result.

It has been established that Habit begins as an imitatory act either below or slightly above the threshold of consciousness, then drops below the consciousness level, performed without the active causative interposition of consciousness. If such be the case, an habitual act, in order to be removed, must be lifted back to a higher level, making of the habitual act a consciousness-accompanied performance, in which case it finally becomes "willed performance" and when the motivation for its performance is wanting, it is lost as routine behavior.

Twitmyer, the arch-pragmatist, had an opportunity for making such an experiment in March, 1918. A young woman, RLB, a graduate of the University of Pennsylvania, came to him with the complaint that she was the victim of a peculiar habit. Regardless of the circumstances, while dining or in the presence of a group of persons, she suddenly became aware of the fact that she was attracting attention by loud noises caused by the snapping of her toes, ankles, knees and fingers. The 'snaps' consisted of sliding of the bones slightly out of joint and produced a noise resembling that heard when one 'cracks his knuckles.' RLB then in her early twenties was the member of a family of some social importance and these uncontrolable acts were most disconcerting and perturbing. Twitmyer attempted to determine the exact time when these acts were initiated and from whom they were learned, but other than that they were probably acquired by childish imitation some years before was not known. That these peculiar acts were habitual and below the threshold of consciousness was

[4] Hart, Bernard, The Psychology of Insanity, 1922, Cambridge University Press.

obvious. To remove them it was necessary to lift the performance into the field of volitional processes. The young woman was instructed to supply herself with a small notebook, to be carried by her always, with the pages divided to accommodate a space for the four types of 'snaps', then at the end of each day to plot a curve showing the results. The efficacy of such a plan is apparent from the figures shown below and the charts A, B, C and D:

Record of "toe snaps"—chart A, RLB

Week of March 17, 1918		Week of March 24, 1918	
Sunday	20	Sunday	6
Monday	4	Monday	2
Tuesday	13	Tuesday	4
Wednesday	2	Wednesday	4
Thursday	11	Thursday	2
Friday	4	Friday	0
Saturday	3		

Record of "ankle snaps"—chart B, RLB

Week of March 17, 1918		Week of March 24, 1918	
Sunday	79	Sunday	39
Monday	85	Monday	26
Tuesday	70	Tuesday	29
Wednesday	80	Thursday	17
Thursday	55	Wednesday	19
Friday	33	Friday	11
Saturday	9		

Record of "knee snaps"—chart C, RLB

Week of March 17, 1918		Week of March 24, 1918	
Sunday	31	Sunday	15
Monday	40	Monday	15
Tuesday	34	Tuesday	11
Wednesday	46	Wednesday	6
Thursday	28	Thursday	9
Friday	19	Friday	7
Saturday	5		

Record of "finger snaps"—chart D, RLB

Week of March 17, 1918		Week of March 24, 1918	
Sunday	31	Sunday	6
Monday	19	Monday	2
Tuesday	4	Tuesday	3
Wednesday	23	Wednesday	1
Thursday	12	Thursday	4
Friday	9	Friday	0
Saturday	1		

It will be seen that within a month the 'toe snaps' and the 'finger snaps' were entirely lost while the 'ankle snaps' dropped from 79 to 11 daily and the 'knee snaps' from 31 to 7 and both subsequently disappeared.

Another interesting case in point is that of a ten year old boy who developed a habit of clearing his throat after each several words which he spoke. Close questioning of the mother

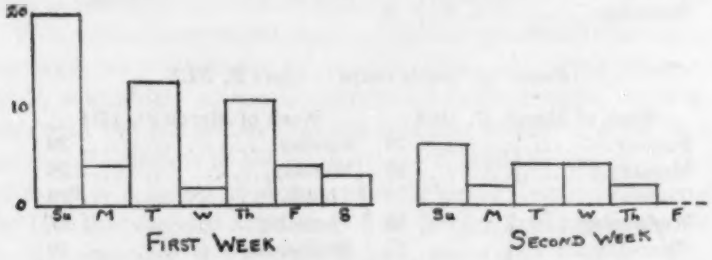

Chart A. Toe Snaps

disclosed that neither the family physician, relatives, piano teacher, preacher nor any other person close to the child had such a habit. However after an hour or more of conversation the boy volunteered the information that his school principal had the habit of clearing his throat when he spoke. Certainly, to the ten year old, the school principal is an individual of no mean authority, and to emulate such a personage seems highly desirable. A similar 'tally method' was prescribed, the habit lifted back to the level of volitional performance and subsequently lost.

Another case is herein reported of a boy twelve years, LG,

brought to the clinic by his brother, a senior at the University. The boy was in the eighth grade, a bright child, pleasing, and in a good state of health. The boy developed a habit of making

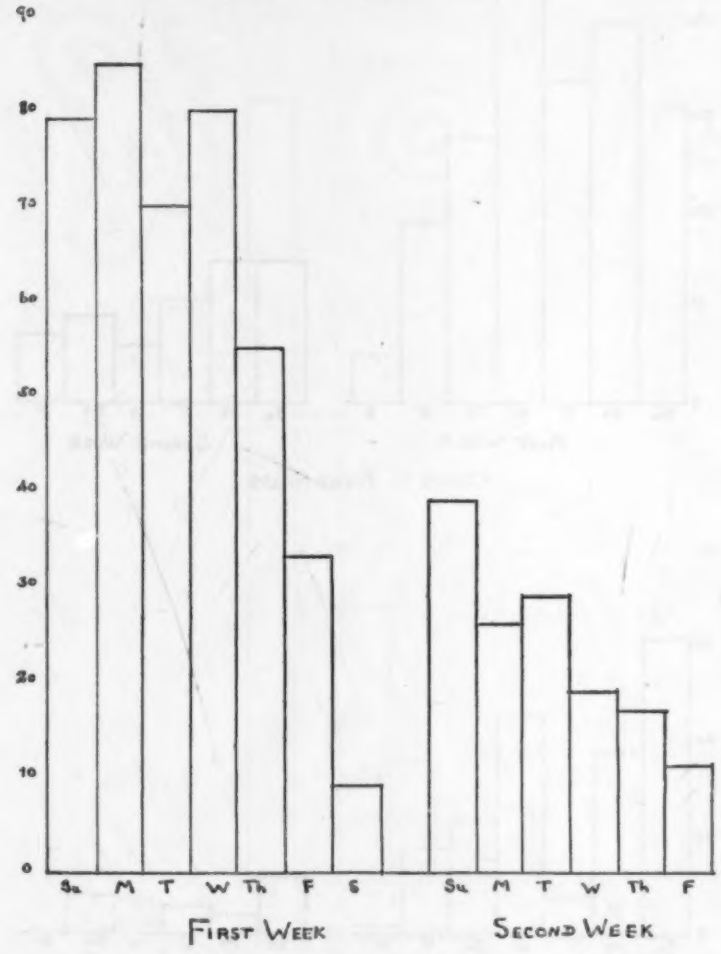

Chart B. Ankle Snaps

a noise which seemed to originate from the contraction of the pharyngeal muscles in the area of the larynx. The sound produced can only be described as the grunt of a pig, or as the

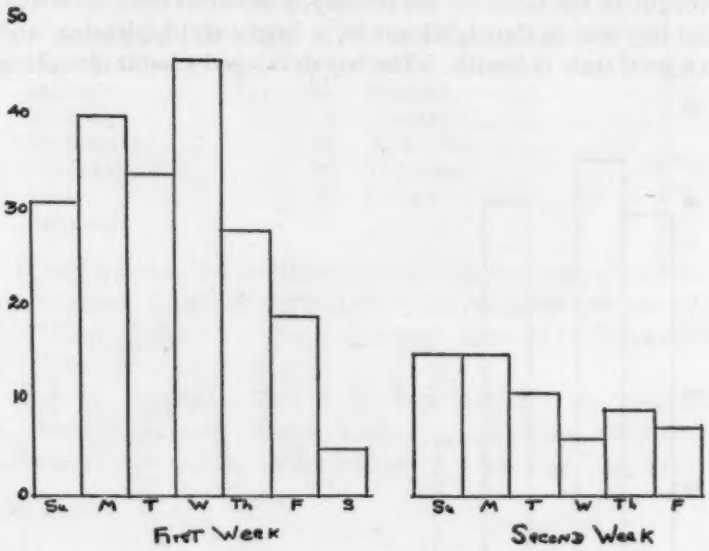

CHART C. KNEE SNAPS

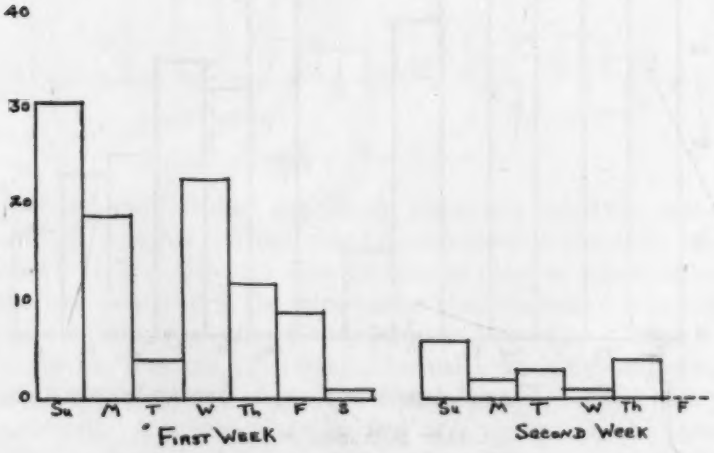

CHART D. FINGER SNAPS

croaking of a frog. It was of such volume and intensity, however, as to have nearly disrupted the household. The noises were made while the child played, studied, while he ate

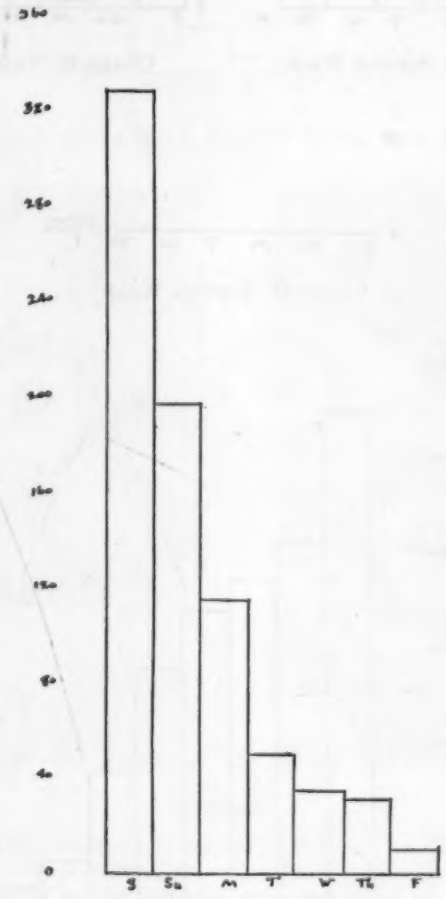

CHART E. FIRST WEEK

and even during his sleep. He claimed that at first he believed the act helped him to breathe and further stated that after a series of such noises he felt a definite soreness in his throat and

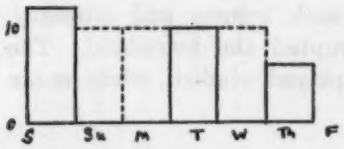

CHART F. SECOND WEEK

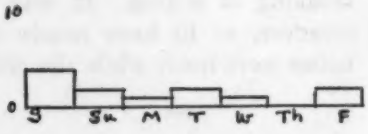

CHART G. THIRD WEEK

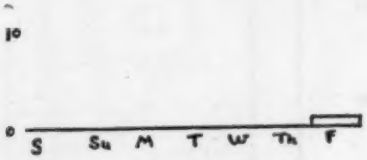

CHART H. FOURTH WEEK

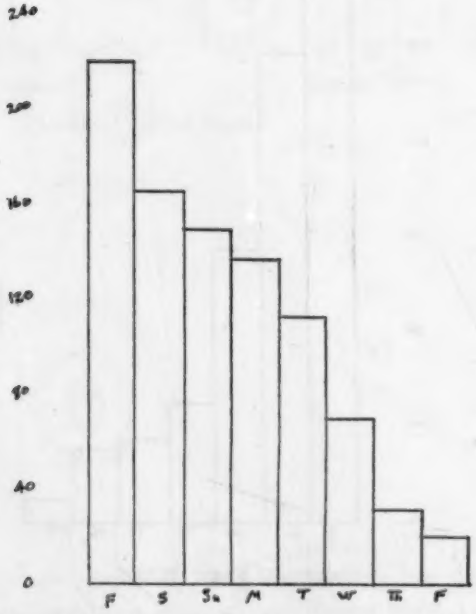

CHART I. FIFTH WEEK (FIRST WEEK, NEW SOUND)

a general fatigue. The family, in more than moderate circumstances, consulted general practitioners and finally was referred

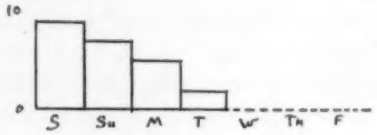

CHART J. SIXTH WEEK (SECOND WEEK, NEW SOUND)

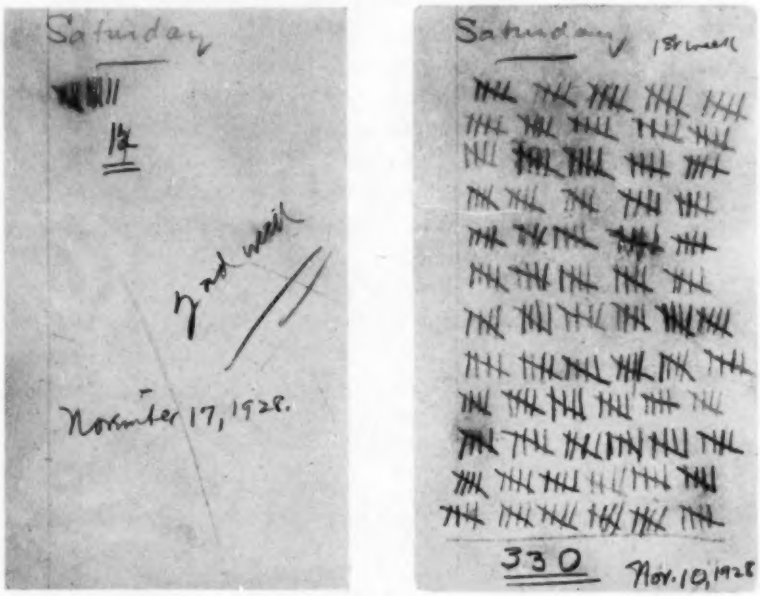

EXHIBIT A

Photographic copies of cards used by L. G. for recording Throat Sounds. The card on the right was used on November 10, the first week. The card on the left was used November 17. These photographs are from the original cards. Note the uniformity in direction of fifth tally from upper left hand corner to lower right.

to several neurologists. The child's tonsils and adenoids were removed in the hope of effecting a cure but without avail.

After several years he was brought to the clinic. In order to elicit absolute co-operation from the child the examiner explained to the mother in the presence of the boy that there were two possible ways to remedy the trouble. The first, surgery, and the other "our own way" which was more pleasant and less dangerous. The success of the latter method, selected by the boy, it was explained, depended on his unfailing co-operation. On November 10, 1928, he was supplied with seven cards (two of which are shown here as exhibit, 'A') each marked with the day of the week and on which he was instructed to make a tally each time the noise was made. The necessity for careful recording was stressed and part of the instructions were that the fifth tally should be made from the upper to the lower corner, no other way being acceptable. As shown by the figures below and charts E, F, G, H, from 330 on the first day he dropped to 0 in twenty days, with only once repeating the noise in the next eight days:

Record "throat sound (posterior)" —chart E, LG

Week of November 10, 1928 (first week)

Saturday	330
Sunday	198
Monday	116
Tuesday	51
Wednesday	35
Thursday	32
Friday	11

Record "throat sound (posterior)" —chart F, LG

Week of November 17, 1928 (second week)

Saturday	12
Tuesday	10
Thursday	6

It will be noticed that during the second week the boy was asked to keep the record only three times. This was done for the reason that often one finds with children their interest is challenged more readily by an occasional day of respite. Another interesting fact to be observed in employing this method is that often on the second or third day the number of habit acts increase, due of course to the reason that then we have not only sub-consciousness threshold habit but also a super-imposed consciousness activity added to the original

pattern performance. At the end of the fourth week the original difficulty had disappeared but the boy proudly supplied the information that he had developed a new noise. This new annoyance came from the throat also, but as he described it was "much further front and not so loud." It was quite apparent from the child's behavior about the clinic, his joy at missing several Friday afternoon classes to come to the clinic, eating in the restaurants on the campus was affording a day of pleasure not to be so lightly lost. This, coupled with the blow to his egocentricity when he found he was no longer occupying the center of the family anxiety was producing the urge for a new difficulty.

There was started immediately a fifth week series. The first week for the new "anterior" noise is shown below in chart I. In order not to permit the child to defeat our purpose he was told that, as soon as this defect was corrected, arrangements would be made to have him continue attending the clinic each Friday for training in elocution. Of course no such program was planned but it functioned in keeping the child interested in ridding himself of his new behavior difficulty.

At the end of eight weeks, being the fourth week of the "new noise" the boy was rid of both of the objectionable habit performances. The actual figures by days for the 'new noise' are reproduced herewith:

Record "throat sound (posterior)" —chart G, LG

Week of November 24, 1928 (third week)	
Saturday	4
Sunday	2
Monday	1
Tuesday	2
Wednesday	1
Thursday	0
Friday	2

Record "throat sounds (posterior)" —chart H, LG

Week of December 1, 1928 (fourth week)	
Saturday	0
Sunday	0
Monday	0
Tuesday	0
Wednesday	0
Thursday	0
Friday	1

Record "throat sounds (anterior)" —chart I, LG		*Record "throat sounds (anterior)"* —chart J, LG	
Week of December 7, 1928 (fifth week—first week new sound)		Week of December 14, 1928 (sixth week—second week new sound)	
Friday	220		
Saturday	165	Saturday	9
Sunday	150	Sunday	7
Monday	138	Monday	5
Tuesday	113	Tuesday	2
Wednesday	71	Wednesday	0
Thursday	31	Thursday	0
Friday	20	Friday	0

The record taking was continued for two weeks (the seventh and eighth weeks—the third and fourth weeks of the new sound). This was done to assure us that not even one 'throat sound' was escaping unnoticed. However after Tuesday of the second week there was not one recurrence.

The same device has been effectively employed in cases of nail biting, picking the fingers, pulling the hair, food eccentricities, pseudo tics, and the most recent case is that of a little girl, aged ten years, a supposed kleptomaniac. The child admitted the thefts which she explained as the result of unthinking impulses. A battery of tests devised to determine a sense of property right and morality as it applies to a ten year old indicated beyond any doubt a rational view point. The therapeutic process in this child's case was made more complicated by insisting that the child list even aborted attempts to molest the property of others. In a few weeks the desired results were obtained, the "irresistible impulse" actually a sub-consciousness threshold habit was brought into the sphere of rationalization and a previously determined normal moral response then saved the situation.

As a result of these experimental diagnostic studies there suggested itself the possibility of employing a similar method in the cases of stammering. This method, however, was contraindicated, because the etiology of speech defect of the stammering type is referrable to other biochemical and metabolic disequilibrations or to anatomical and functional disturbance

or in the cases of psychopathic stammerers to psychoses. This emotional phase of stammering is ably suggested in the work of Hunter, (W.S.)[5] in his SP-LR formula (S-Stimulus, L-Language, P-Process, R-Response) who considers Emotion is an LR whose SP is an almost total bodily activity.

In concluding, attention is directed to the work of Lashley and Herrick in which is to be found anatomical and physiological explanation of what was, on the part of Twitmyer, a strictly "conceptual" scientific approach. The employment of pure science and its acceptance to the pragmatist is predicated on the assumption that its tenets work. This in the case of the bodily movement (behavior) schema here presented has withstood the exactions of many years of clinical experience.

[5] Hunter, Walter S., Psychology and Anthroponomy, Psychologies of 1925, Clark University Press.

SELECTING MUSICAL TALENT

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The purpose of this study is primarily to find out the relation between students' scores in the Seashore Measures of Musical Talent and their success in courses taken in a school of music. The problem might be stated as follows: To what extent do the Seashore Measures of Musical Talent enable us to predict the probable success of entrants in a school of music? Other questions considered involve: the relation between scores in the Seashore tests and different types of subjects required of music students; the relative value of the various parts of the Seashore tests for predicting success in music; and the relative worth of intelligence tests and of Seashore test for predicting success in different sorts of subjects required of music students and in the music course as a whole.

The study is based upon the records of fifty-nine girls who entered the School of Music of the North Carolina College for Women in September 1922. These records include the following data:

1. Scores on the Seashore Measures of Musical Talent administered in September 1922.
2. Scores on the Terman Group Test of Mental Ability and Thurstone Psychological Examination administered in September 1922.
3. The marks made on all subjects taken while in college; and the date of leaving college in those cases where the course was not completed.

The five Seashore tests used were those for pitch, time, intensity, consonance and tonal memory furnished on phono-

graph records. The directions accompanying the tests were used (6). Since each of the tests was given more than once, testing was divided between two successive days.

Each test makes use of the two sides of one record. These sides are designated as A and B, respectively. In the cases of pitch, time, and memory B is the more difficult half of the test. The intensity and consonance tests are not so divided as to difficulty. With this explanation the amount of testing done with the five Seashore tests may be represented as follows:

Pitch testing consisted of parts A, B, A, B, and B.
Intensity testing consisted of parts A, B, and A.
Time testing consisted of parts A, B, and B.
Consonance testing consisted of parts A, B, A and B
Memory testing consisted of parts A, B, A, and B.

Since A and B each represent half of a test, the recurrence of these letters show the number of repetitions and the parts repeated in each test. A and B constitute the complete test for each trait tested. It should be pointed out also that those tests which were repeated were repeated on the second day of the testing.

The two mental tests, Terman and Thurstone, were administered two weeks apart. The scores from the two tests were combined by averaging each girls S.D's in the two tests. This composite of the two tests is used in all calculations involving the mental tests results.

The complete academic records of the fifty-nine subjects were obtained. These records included the subjects taken while in college and the marks made on these subjects. The next step was to group the subjects required in the music course in three classes as follows:

1. Academic subjects—including such as English, French, Psychology, etc.
2. Music theory subjects—including Harmony, History of Music, Music Appreciation, etc.
3. Applied subjects—including training in the use of whatever instrument or instruments that may have been taken by the student.

Each student's course is made up of about the same number of credit hours from each of the above groups.

In securing the marks made by these girls in the courses taken a record was made of the length of time each girl remained in college. The absence of complete data on the causes for which students terminated their connection with the college precluded the use of this data in the comparisons that follow.

RELIABILITY

Degrees of reliability of the Seashore tests have been reported by several investigators. Table 1 shows coefficients of reliability found in four investigations including this one. The writer

TABLE 1

Reliability of the Seashore tests

INVESTIGATOR	NUMBER OF SUBJECTS	PITCH	INTENSITY	TIME	CONSONANCE	TONAL MEMORY	RHYTHM
Brown	90	.71	.65	.48	.43	.59	.29
Highsmith	59	.762	.500	.521	.526	.820	
Lanier	100	.701	.570	.451	.510	.650	.368
Ruch and Stoddard	100	.70	.66	.53	.35	.66	.50

also determined the reliability of the Seashore tests as a whole when all the sittings were thrown together. The two halves when "stepped up" by the Spearman-Brown formula gave a reliability of .89 $\pm$ .054.

This table shows a good deal of agreement relative to the reliability of the different tests. Taken separately the different tests do not show very high reliability. However, the reliability for the whole test repeated as in this investigation shows a fairly high reliability.

VALIDITY

Studies of the validity of the Seashore tests do not provide the uniformity of results found in the case of the reliability. In the main these studies have rested upon teacher or specialist

ratings as the criterion of musical capacity. Brennan (1), Brown (2), and Schoen (5) each used such ratings. The criteria used in this study falls under two heads. First, there are the marks made by students pursuing music courses in college. Second, the relative length of time students remain in

TABLE 2

*Coefficients of correlation**

	PITCH	INTENSITY	TIME	CONSONANCE	TONAL MEMORY	AVERAGE OF ALL TESTS	INTELLIGENCE	ACADEMIC COURSES	MUSIC THEORY
Applied Music	.180	.333	.256	.040	.101	.312	.423	.550	.367
Music Theory	.409	.353	.304	.234	.043	.494	.602	.631	
Academic Courses	.400	.330	.356	.085	.121	.494	.787		
Intelligence	.581	.351	.385	−.143	.299	.397			

* Only coefficients of .35 or more are as much as four times their probable error. Coefficients of .50 are approximately seven times their P.E. Coefficients of .60 are nine times their P.E. Coefficients of .70 are fourteen times their P.E.

TABLE 3

*Coefficients of correlation**

	INTELLIGENCE	ACADEMIC COURSES	MUSIC THEORY	APPLIED MUSIC
Average Seashore tests	.362	.526	.426	.130
Intelligence		.714	.660	.334
Academic			.610	.260
Music Theory				.110

* See note to table 2 for P.E.'s of the above coefficients.

college is compared with different degrees of ability as measured by the Seashore tests and by intelligence tests.

Table 2 shows the correlations between the averages of all marks in applied Music, Music Theory, Academic courses, and intelligence, respectively, and the various parts of the Seashore tests.

Table 3 shows the intercorrelations for average of Seashore tests, intelligence, academic marks, music theory marks, and applied music marks when the marks used were for the first year only.

Several observations may be made relative to the correlations shown in tables 2 and 3.

1. Scores on the Seashore tests, taken singly or as a whole, show practically no relationship to students' ability in musical performance as measured by marks given by instructors.

2. Intelligence tests show a slight superiority over the Seashore tests as a means of predicting success in Musical performance. Success in music theory and academic courses is predicted rather well by the intelligence tests.

3. Music theory and academic courses show considerably more relationship with average of all Seashore tests than do Applied Music courses.

4. Taking the statements in (2) and (3) together, we may say that ability in musical performance (applied music) is conditioned more upon traits measured by intelligence tests and upon abilities to succeed in academic subjects than upon the traits measured by the Seashore tests.

5. Ability in musical performance seems either to be dependent upon traits only slightly touched by any of the measures used here, or to be so unreliably indicated by instructors' marks that it cannot be investigated until a more reliable criterion of musical performance is found.

The question may be raised here as to whether the Seashore tests, though giving low correlations with marks, do not nevertheless measure distinct factors in musical capacity. As a tentative answer to this question the partial and multiple correlations for applied music marks, Seashore tests, and intelligence were calculated.

The partial correlation of applied music marks and Seashore tests scores when intelligence is held constant is .173. The multiple correlation for applied music with the Seashore tests and intelligence together is .453. Since the correlation between applied music marks and intelligence is .423, it appears that

the Seashore tests add but little that is not included in the intelligence tests.

Brown (2) upon finding a low correlation between Seashore test results and teachers' judgment of musical ability, remarks that, "The correlation of .38 ± .05, considering the inadequacy of the criterion, is significant." Brennan (1) found a correlation of .54 ± .10 between the combined ratings of four "expert judges" on performance and the Seashore tests when the subjects chosen ranged from seventh grade to college seniors in maturity and from poor to excellent in their music work. Schoen (5) used teachers' ratings as a criterion with which to compare test results. However, the absence of coefficients of

TABLE 4

Percentile ranks of two attendance groups in Seashore and intelligence tests

LENGTH OF ATTENDANCE	NUMBER OF CASES	MEDIAN PERCENTILE IN	
		Seashore tests	Intelligence tests
Less than 2 years	28	35.1	33.9
Two years or more	31	60.0	62.7
Difference		24.9	28.8

correlation and the degree of selection used in choosing his subjects makes it unsafe to compare his results with those above.

On the whole the investigations cited above and the present study are in pretty close agreement as to the low predictions given by the Seashore tests.

ATTENDANCE RECORD

From a record of the dates on which different students dropped out of the music courses another comparison was made. The fifty-nine students were first divided into two groups: (*a*) those who remained in the music school less than two years; and (*b*) those who were there for two or more years,

including those who graduated. The median percentile ranks for the two groups were then found in the Seashore and intelligence tests, respectively. The results are brought together in table 4.

While the differences between the two groups in the Seashore and intelligence tests are not statistically reliable, they are at least in accord with results given above in showing the superiority of the intelligence tests for predicting the future of music students. Both tests show considerable differences in the rank of students who stay in school less than two years as compared with those who remain longer. The intelligence tests show a superiority of four points in the amount of difference as compared with the Seashore tests.

CONCLUSIONS

1. The reliability of the Seashore Measures of Musical Talent is fairly high for the test as a whole, but low for most of the parts of the test.

2. The validity of the tests when measured by school marks is very low, .312.

3. The intelligence tests used gave a better prediction, r equals .423, of probable success in music than the Seashore tests.

4. There is apparently very little measured by the Seashore tests which is not measured also by the intelligence test.

5. On the whole the Seashore tests proved of doubtful value as means of predicting the probable success of students in music.

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MEASUREMENT OF READING SKILLS IN ABILITY GROUPS

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This report deals with the application of one form of each of three standardized reading tests to three groups of children in grade 7-A in the Woodrow Wilson Junior High School of San Diego, California. The data were gathered through the coöperation of faculty members of the school. The tests used were the Haggerty Reading Examination, Sigma 3; the Sangren-Woody Reading Test; and the Monroe Standardized Silent Reading Test, Revised Edition, Test III. Each test was given to each of the children in an accelerated group, in an average group, and in a retarded group. These groupings had been previously determined on the basis of findings of mental ability tests and teacher ratings for each child concerned.

The distributions of scores are summarized in the first four tables. Table 1 is concerned with the findings yielded by the Haggerty Reading Examination, Sigma 3; table 2, with the findings yielded by the Sangren-Woody Reading Test; table 3, with the comprehension scores yielded by the Monroe Standardized Silent Reading Test, Revised; and table 4, with the rate scores yielded by the Monroe test.

It is worth noting that neither the Haggerty nor the Monroe test is well suited to retarded pupils. There are quite large differences in average ability between the retarded and average groups when these are compared with the differences in average

TABLE 1

Measures of central tendency, of unreliability, and of variability for the scores yielded by the Haggerty Reading Examination, Sigma 3

GROUP	NUMBER	MEDIAN	MEAN	$P.E._M$	STANDARD DEVIATION	C. OF V. (PEARSON)
Retarded Group.....	27	48.75	50.74	3.01	23.20	45.72
Average Group.....	36	72	74.72	2.11	18.72	25.05
Accelerated Group.....	36	77.14	76.39	2.04	18.13	23.73

TABLE 2

Measures of central tendency, of unreliability, and of variability for the scores yielded by the Sangren-Woody Reading Test

GROUP	NUMBER	MEDIAN	MEAN	$P.E._M$	STANDARD DEVIATION	C. OF V. (PEARSON)
Retarded Group.....	27	55	65	2.17	21	32.31
Average Group.....	36	76.87	79.57	2.17	19.3	26.39
Accelerated Group.....	36	95	93.99	1.51	14.61	15.58

TABLE 3

Measures of central tendency, of unreliability, and of variability for the comprehension scores yielded by the Monroe Standardized Silent Reading Test, Revised

GROUP	NUMBER	MEDIAN	MEAN	$P.E._M$	STANDARD DEVIATION	C. OF V. (PEARSON)
Retarded Group.....	27	9.69	12	1.07	8.25	68.75
Average Group.....	36	25	26.38	1.36	12.06	45.62
Accelerated Group.....	36	30.99	31.9	1.21	10.75	35.66

TABLE 4

Measures of central tendency, of unreliability, and of variability for the rate scores yielded by the Monroe Standardized Silent Reading Test, Revised

GROUP	NUMBER	MEDIAN	MEAN	$P.E._M$	STANDARD DEVIATION	C. OF V. (PEARSON)
Retarded Group.....	27	63	59.1	1.12	8.66	14.65
Average Group.....	36	85	88.88	3.12	27.72	31.19
Accelerated Group.....	36	95	95.83	3.54	31.48	32.85

TABLE 5

Reliability of the differences between mean scores yielded by the Haggerty Reading Examination, Sigma 3, for the different groups

GROUPS	$\frac{\text{Diff.}}{\text{S.D.(diff.)}}$	CHANCES IN 100 (APPROXIMATED)	PER CENT NECESSARY TO INSURE A FINDING ALWAYS GREATER THAN ZERO
Retarded and average.....	4.41	100	147
Retarded and accelerated.....	5.91	100	197
Average and accelerated.....	0.34	64	11.3

Note: This table may be interpreted as follows: The difference in mean scores for the retarded and average groups divided by the standard error of the difference yields a finding of 4.41. The chances, then, are that the true difference (the difference between the true measures) in achievement between the retarded and average groups is greater than zero. A finding of 3 means practically complete reliability; one greater than three means just so much added reliability.

TABLE 6

Reliability of the differences between mean scores yielded by the Sangren-Woody Reading Test for the different groups

GROUPS	$\frac{\text{Diff.}}{\text{S.D.(diff.)}}$	CHANCES IN 100 (APPROXIMATED)	PER CENT NECESSARY TO INSURE A FINDING ALWAYS GREATER THAN ZERO
Retarded and average.....	2.82	99.75	94
Retarded and accelerated.....	6.14	100	204.7
Average and accelerated.....	3.57	100	119

TABLE 7

Reliability of the differences between mean comprehension scores yielded by the Monroe Standardized Silent Reading Test, Revised, for the different groups

GROUPS	$\frac{\text{Diff.}}{\text{S.D.(diff.)}}$	CHANCES IN 100 (APPROXIMATED)	PER CENT NECESSARY TO INSURE A DIFFERENCE ALWAYS GREATER THAN ZERO
Retarded and average.....	5.61	100	187
Retarded and accelerated.....	8.31	100	277
Average and accelerated.....	2.05	98	68.3

ability between the average and accelerated groups. It is always of interest to know whether differences such as have been found between the abilities of the several groups are differences such as would always be found, or whether the differences are such as occur in the random sampling of identical materials. Findings as to the reliability of differences in mean scores are given in tables 5 to 8 inclusive.

The outstanding fact shown in tables 5 to 8 inclusive is the difference between mean scores for the average and accelerated groups was not significant for either score yielded by the Monroe test nor for the score yielded by the Haggerty test. In other words, in these instances the difference was such as

TABLE 8

Reliability of the differences between mean rate scores yielded by the Monroe Standardized Silent Reading Test, Revised, for the different groups

GROUPS	$\frac{\text{Diff.}}{\text{S.D.(diff.)}}$	CHANCES IN 100 (APPROXIMATED)	PER CENT NECESSARY TO INSURE A DIFFERENCE ALWAYS GREATER THAN ZERO
Retarded and average.....	6.06	100	202
Retarded and accelerated.....	6.67	100	222.3
Average and accelerated.....	0.99	84	33

one might obtain by random sampling of identical materials. This fact is all the more significant when one considers that the findings for the differences between mean scores for the retarded and average groups were little smaller than the findings for the differences between retarded and accelerated groups, and that in both instances (in tables 5 to 8 inclusive) the difference was a reliable one.

The data given in these four tables indicates that there are possibilities for developing silent reading tests which are superior to what we now have. The Sangren-Woody Reading Test alone seems suited equally well to pupils of poor ability as well as pupils of average and good ability. There is another approach to the same problem, however, that of determining the validity of the different tests. Table 9 includes validity

coefficients for the paired scores yielded by the three tests considered in this report.

Each of the above coefficients was corrected for attenuation to eliminate "errors of observation." The findings are given in table 10.

TABLE 9

Validity coefficients for three silent reading tests. 99 cases

TEST	MONROE (RATE)	MONROE (COMPREHENSION)	HAGGERTY SIGMA 3
Sangren-Woody	.725 ± .032	.712 ± .033	.697 ± .035
Monroe (rate)		.753 ± .029	.557 ± .046
Monroe (comprehension)			.710 ± .033

TABLE 10

Validity coefficients for three silent reading tests corrected for attenuation. 99 cases

The reliability measures used are those given by the test authors in their manuals or in Kelley, Interpretation of Educational Measurements.

TEST	MONROE (RATE)	MONROE (COMPREHENSION)	HAGGERTY SIGMA 3
Sangren-Woody	.820	.821	.743
Monroe (rate)		.972	.705
Monroe (comprehension)			.863

All of the validity coefficients are high. The increase in the value of the coefficients when the correction for attenuation was made seems to indicate that we need to improve our technique for giving tests as well as improve the tests themselves.

A SHORT SCALE FOR MEASURING INTROVERSION-EXTROVERSION

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(As from the Colgate Psychological Laboratory)

There have been devised several methods of measuring introversion-extroversion, but these have been universally long and difficult to administer and score. The Colgate Personal Inventory, Form C-2, is one of these which has been proven by use to be fairly adequate; but it has been felt that if the time element could be reduced it would have a greater application. Our problem was then to devise a test based on this one that would be short and still have enough accuracy to make its use valid. Some degree of validation must be inevitably sacrificed by a reduction in length, but trustworthy proximation to reliability has been made in producing a short rating scale, diagnostic of introversion-extroversion.

METHODS

The method by which the traits were selected was as follows. Using a group of tests from 276 juniors and sophomores, each of 48 traits was measured for its diagnostic quality. That is how well the results of each single trait indicated the total score. The upper and lower quartile in the scores of these students were designated respectively as introverts and extroverts. For each trait the percentages of each group marking the trait introvert were recorded and the standard error computed by this formula:

$$E^2_{12} = \frac{p_1 q_1}{n_1} + \frac{p_2 q_2}{n_2}$$

COLGATE PERSONAL INVENTORY C-4

Directions: Describe yourself by answering the questions which are numbered at the left. Do this by making a check or mark through one of the half inch lines. After reading the phrase after each question think back over your life for the past few months and determine where the check mark should be made to describe yourself accurately. Describe your average behavior and thoughts. THERE IS NO TIME LIMIT TO THIS TEST.

1. How Easily Have Your Feelings Been Hurt by Remarks or Actions Referring To You?	Easily and often aroused	Feelings easily hurt	Usually noticed others intentions	Affected in rare instances	Gave them no attention
2. How Have you Felt When Praised?	Thought it over seriously	Pondered some praise	Took praise lightly	Quickly forgot	Seldom noticed it
3. Have You Studied the Motives of Others?	Seldom considered them	Have observed motives a few times	Occasionally try to unmask motives	Sometimes study motives	Inclined to study motives carefully
4. How Have Your Likes for Athletics and Intellectual Things Compared?	Liked best all intellectual	Preferred intellectual	Little preference	Preferred athletics	Happiest in all physical contests
5. Have You Experienced Fine Sentiments and Emotions?	Easily moved to tears	Sympathized readily	Not especially sensitive	Often unmoved	Unsympathetic
6. Have You Worked with Others?	Much preferred to work alone	Inclined to be independent	Worked with others in some cases	Liked working with others	Sought work with others

7. How Have You Been about Making Friends?	Cautious	Must know them a long time	Slightly reserved	Get acquainted easily	Made friends with everyone
8. Have Your Moods Changed Without Apparent Cause?	Often changed	Changed in some instances	Kept in fairly uniform spirits		Moods almost always the same
9. Have Your Moods Changed with Cause?	Always responded quickly	Fairly quick response	Must be strong reason		Seldom changed
10. Have You Expressed Yourself Better in Speech or in Writing?	Best in writing	Preferred writing	No preference	Preferred speaking	Talk considerably better

in which $p - 1$ is the per cent of the first group marking a trait, $q - 1$ the per cent not marking the trait, and $n - 1$ the number in the group; $p - 2$, $q - 2$ and $n - 2$ are the same for the second group.

The number of times the difference in the percentages of introverts and extroverts checking the trait in the introvert quartile was this standard error measured the diagnostic value of the trait. They differed very greatly from more than eight times to less than the standard error. The six most diagnostic of the traits were selected, but these proved insufficient and four more were added. Work done later on groups of college women, adult men and adult women, validated the selection to a large extent. In all but two cases these groups showed as great if not greater diagnostic quality than the college men and in these two cases the drop in diagnostic value was not sufficient to necessitate changing or dropping that trait from our short scale. These ten traits comprise the short scale for measuring introversion-extroversion.

DESCRIPTION OF SCALE AND METHOD OF SCORING

The method of scoring was changed from that of the original C2 test. That method was to determine the portion of the rating line in which the most introvert quartile of the marks fell. Then each check that fell in this portion was given a score of one and the total of these measured the degree of introversion. It was found that this "all or none" method yielded too small a range of scores on a short test and too great chance for unreliability. The method was changed to a "graduated scoring" by dividing the line into ten equal spaces starting from the extrovert end of the rating line, each two spaces were counted as one; so scoring ranged 0, 1, 2, 3, 4. A check falling in the two most introvert spaces would be given a score of four, in the two most extrovert, a score of 0, etc. This not only gave a greater range of scores, but we were fully justified in using it for it showed both greater reliability and greater validity than the other method.

Validity (agreement of a single self-rating with average of two ratings by acquaintances):
Scoring all or none.....$r = + .457$
Graduated scoring.....$r = + .576$

Reliability C-4 (Agreement on two ratings a month apart, several other ratings having been made in the interval to "fog" the subjects):
Scoring all or none.....$r = + .61$
Graduated scoring.....$r = + .82$

Reliability C-5:
Scoring all or none.....$r = + .71$
Graduated scoring.....$r = + .73$

The test for rating a person by friend or associate was taken directly from this test without further mathematical treatment. The method of scoring is the same. Test C-4 is illustrated; this is a self-rating. Test C-5 is the same but adapted so that employees or acquaintances may do the rating.

CORRESPONDENCE WITH ORIGINAL TEST

With traits thus carefully selected with respect to their ability to give results commensurate with total scores on a test five times as long, we succeeded in getting a high correlation between the score for these selected traits and the larger test score. Using a limited number of tests, this gave a correlation of .81 with a P.E. of .025. This seems to indicate that the test gives results sufficiently like those of the large test to be of practical use.

VALIDITY AND RELIABILITY

To find the validity and reliability of the test, the short C-4 scale was administered to approximately 80 students in elementary psychology classes. They were also scored by friends on the corresponding C-5 scale. Six weeks later both tests were readministered. The results for validity gave a correlation of .576 with a P.E. of .054. The previous tests for validity of the long scale gave correlations between C-2 and C-3 of over .8.

Reliability for the C-4 scale with a correlation between scores on the first rating and those on one four weeks later gave a correlation of .82 with a P.E. of .026. The C-5 scale under the same conditions gave a correlation of .73 with a P.E. of .046. The original long tests gave correlations of approximately .9 for reliability, but these are sufficiently large to make the use of the scale feasible.

SUGGESTED USES FOR THE SCALE

The scale should have a wide range of use in industrial and personnel work. The long scale takes approximately forty minutes to administer carefully. This is all right for isolated research, but impractical for industry. The short scale can be administered in less than ten minutes to college students and it should take but little longer for industrial workers if the administration is efficient. The short scale is easier and quicker to score, requiring no stencils. The matter of expense, which is an important item for the long scale is considerably lessened in the short scale. There has never been sufficient data to determine fully the relation between introversion-extroversion and personnel inclination or adaptability for differing industrial and commercial work. This scale giving a quick, cheap, yet fairly accurate measure of introversion-extroversion should quickly yield sufficient data for the edification of the theorist and the benefit of the personnel director and his charges.

A STUDY OF THE POSSIBILITY OF PROGNOSIS OF SCHOOL SUCCESS IN TYPEWRITING[1]

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THE PROBLEM

This investigation is confined to a study of school success in typewriting as the first hurdle in success in occupations requiring a knowledge of the subject.

While much has been accomplished in achievement tests and in trade tests little has been done by way of the prognosis of aptitude for clerical work except to establish certain minimum intelligence levels for commercial occupations. The fact that many pupils of high intelligence quotients fail in commercial subjects is an indication that something more than mere intelligence is required for success in clerical occupations.

If it is possible to know before the child studies bookkeeping that he lacks some essential quality necessary to success in bookkeeping, then he certainly should not try to become a bookkeeper but should be directed into some more profitable channels of learning.

An attempt was made to find the relationship existing between success in the school subject of typewriting and certain tests of proficiency and aptitude.

Wherever the coefficient of correlation was found to be sufficiently high to indicate aptitude for the subject the test

[1] Presented as a Master's Thesis to the School of Education of the University of Southern California under the direction of Dr. A. S. Raubenheimer. A study was also made of Prognosis of Success in Bookkeeping to be reported in a later issue of this JOURNAL.

papers and grades of the students were divided into two groups: those of the healthy children in one group, and those of the children showing physical defects, as indicated by the physician's physical examination, in another group. The relationship existing between health and school success was then studied.

TREATMENT OF THE SUBJECT

In an attempt to discover what factors are most indicative of school success or failure in typewriting students in beginning typing were given the following tests during the first two weeks:

1. Thurstone Employment Tests, Examination in Clerical Work; Form A.
2. Terman Group Test of Mental Ability, Form A.
3. MacQuarrie Test of Mechanical Ability.
4. Fundamentals of Arithmetic.
5. Spelling.
6. Physical examination by school physicians.

An intensive study of the relationship between these tests and school success in typewriting was then made. Careful records were kept of all results of achievement tests and grades in the subject under investigation during the period of the study.

SUBJECTS

The study was made upon a group of seventy-five tenth grade students enrolled in typewriting in the Bell High School, Los Angeles City School System, in September, 1927. At the end of the period of study there were fifty-six students left in the group.

Besides the intensive study made of the above mentioned group the results of the typing tests given to 3159 students in Typing I (first semester typing) in the schools of Los Angeles City in June 1927, which included 1434 senior high school students and 1725 junior high school students, were studied in finding the relationship between intelligence and typing.

The period of time covered by the experiment was twenty weeks.

With the exception of the 3159 students of typing in the schools of Los Angeles and the physical examinations all tests were given and scored by the writer during the first two weeks of the school year. The testing was done in the class rooms in groups of approximately twenty-five, and no two tests were given on the same day. The typing tests were given by the respective class room teachers while the physical examinations were made by the school physicians.

TYPING TESTS USED

In measuring achievement in typewriting the tests used were the Blackstone Proficiency Tests in Typewriting and the Underwood tests. In the Bell High School the Underwood Tests were used merely as a check on the other tests.

The Los Angeles City typing test was used in testing all children in the junior and senior high schools of the city. The Los Angeles City School Typing Test and the Underwood test scores are arrived at by the International Typewriting Contest Rules which call for a deduction of ten words for each error. The Blackstone formula for accuracy is $\frac{\text{strokes} \times 10}{\text{errors} + 10}$. The Blackstone Stenographic Proficiency Test in Typing, Forms A, B, C, D, and E, was used as a measure of success in typing for the group of students in Bell High School.

RELATIONSHIP BETWEEN SCHOOL SUCCESS IN TYPEWRITING AND OTHER TESTS

An intensive study was made of a group of thirty-seven tenth grade typing students in the Bell High School in their first semester of typing.

The chronological age range was from fourteen years six months to seventeen years six months; and mental age range was from twelve years six months to eighteen years three months and the intelligence quotient ranged from 75 to 123.

A study was also made of the relationship between typing

success and intelligence from the typing test papers of all beginning typing students in the schools of Los Angeles in June 1927, making a total group of 3159 students.

The age range of this group was from eleven (years of age) to nineteen years of age, and the intelligence quotient ranged from 70 to 179. This group had studied typing for eighteen weeks when the typing tests were given.

TABLE 1

Correlations of typing scores on the Blackstone Stenographic Proficiency Tests at the end of the twenty-sixth week of typing with Terman Group Test of Mental Ability, Form A

The group consisted of 32 students in the Bell High School, Los Angeles City School System.

	BLACKSTONE TYPEWRITING PROFICIENCY	
	Correlation with accuracy	Correlation with speed
Terman total score	.168 ± .116	.244 ± .112
1. Information	−.145 ± .116	−.174 ± .115
2. Best Answer	.09 ± .118	.154 ± .116
3. Word Meaning	.119 ± .118	.143 ± .117
4. Logical Selection	.044 ± .119	−.058 ± .119
5. Arithmetic	.374 ± .118	.422 ± .098
6. Sentence Meaning	−.119 ± .118	.06 ± .119
7. Analogies	.075 ± .119	.229 ± .112
8. Mixed Sentences	.216 ± .113	.257 ± .111
9. Classification	.06 ± .119	.169 ± .116
10. Number Series	.188 ± .115	.243 ± .112

Correlations with typing for all the tests in the Terman Group Test of Mental Ability, Form A, the MacQuarrie Test of Mechanical Ability, the Thurstone Employment Tests in Clerical Work, bookkeeping grade, arithmetic, and spelling were worked out.

Typing correlations with bookkeeping, arithmetic and spelling

Contrary to popular belief a test of the simple fundamentals of arithmetic correlated higher with typing than did a test of spelling (table 2).

No test was found to correlate sufficiently high to be of very great service in educational guidance. Bookkeeping grades were found to have a higher correlation with typing than did any of the other tests given, having a positive correlation of .522 ± .088 with accuracy score, and a correlation of .398 ± .106 with typing speed. Since in most high schools typing is given either before bookkeeping or concurrently with it, it is obvious that bookkeeping could not be used in the prognosis of probable success in typing (table 2).

TABLE 2

Correlation of typewriting with bookkeeping grade, arithmetic, and spelling

	NUMBER OF CASES	CORRELATION WITH TYPING SCORES	
		Accuracy	Speed
Bookkeeping grade	37	.522 ± .088	.398 ± .106
Arithmetic	37	.396 ± .096	.318 ± .101
Spelling	36	.324 ± .10	

Relationship between typewriting and intelligence

In the Terman Group Test of Mental Ability the test which gave the highest correlation with typing was Test 5, arithmetic, (table 1), which gave a positive correlation of .374 ±.188 with accuracy, and .422 ± .098 with speed; while the Terman total score gave only a correlation of .168 ± .116 with accuracy, and .244 ± .112 with speed. Mixed sentences showed a positive correlation of .215 ± .113 with accuracy, and .257 ±.111 with speed. Information, Logical Selection, Sentence Meaning, all gave a very low but negative correlation, which probably means no correlation. The Best Answer, Analogies, Word Meaning, and Classification tests showed a very low but positive correlation and probably also denotes no correlation, as shown in table 1.

The higher correlation of Test 5, arithmetic, bears out the higher correlations of bookkeeping and fundamentals of

arithmetic and indicates that the intelligence test as a whole cannot be relied upon to indicate typing success, but that there are elements in it, as of arithmetic, which show promise of having predictive value if developed further. Since these figures were based upon only 32 cases they are more suggestive of probability of a relationship than of certainty. The correla-

TABLE 3

Correlation between typing I (first semester typing) and other criteria. Result of typing that was given to all pupils in junior and senior high schools in Los Angeles city schools in June, 1927

CRITERIA	NUMBER OF CASES	RANGE OF C.A. OR IQ	CORRELATION WITH TYPING	
			Speed	Accuracy
Intelligence Quotient...	800	C.A. range 12 years to 19 years	.326 ± .021	.22 ± .022
Intelligence Quotient...	186	C.A. constant 13 years to 13 years 6 months	.212 ± .049	.246 ± .046
Intelligence Quotient...	233	C.A. from 14 years 2 months to 14 years 4 months	.257 ± .056	.223 ± .056
Mental Age.....	264	C.A. from 12 years 6 months to 19 years		.206 ± .039
Chronological Age.....	215	IQ constant at 100–102	.099 ± .044	.053 ± .038

tion between typing and mental age as well as IQ when based on the 800 children tested among the 3159 in June 1927 in the Los Angeles Schools was slightly higher than the correlations with typing for the 32 students in Bell High School, but there was not enough variation to affect the validity of above mentioned correlations, but rather offer confirmation of their accuracy.

In the group of 3159 children in first semester typing in Los Angeles in June 1927, there were 233 children between fourteen years of age and fourteen years four months, which

TABLE 4

Relationship between IQ and typing success of children of the same chronological age; showing the results obtained from two groups; one group made up of children of ages fourteen years, and the other group made up of children thirteen years of age

GROUP I C.A. FROM 14 YEARS TO 14 YEARS 4 MONTHS			GROUP II C.A. FROM 13 YEARS TO 13 YEARS 6 MONTHS		
Number of cases	IQ	Average words per minute	Number of cases	IQ	Average words per minute
12	78–80	16.0	12	90–99	15.7
77	90–101	16.7	45	100–109	14.6
98	102–113	18.5	67	110–119	18.6
36	114–125	20.3	42	120–129	20.7
10	126–137	18.9	13	130–139	18.8
			5	140–149	25.1
			2	150–159	24.5

TABLE 5

Average typing scores of 215 children of different chronological ages but with the same IQ

Children with intelligence quotients of 101 and 102 were chosen

NUMBER OF CASES	CHRONOLOGICAL AGE	AVERAGE TYPING SCORE
15	12 years 7 months to 13½ years	113.5
69	13 years 7 months to 14½ years	120.3
58	14 years 7 months to 15½ years	119.2
41	15 years 7 months to 16½ years	124.9
15	16 years 7 months to 17½ years	120.8
17	17 years 7 months to 18½ years	132.4

gives a large enough group of the same chronological age to be able to discover the influence of a variable IQ. The tendency was for the average words per minute to increase with the

IQ up to an IQ of 125, but at that point a slight drop in the number of words per minute was noticed. The highest peak in typing success was reached by children with IQ from 114 to 125, with those having IQ above 125 taking second place.

Another group of 186 children between thirteen and thirteen and one half years of age showed the same tendency as the fourteen year old group for the number of words to increase with

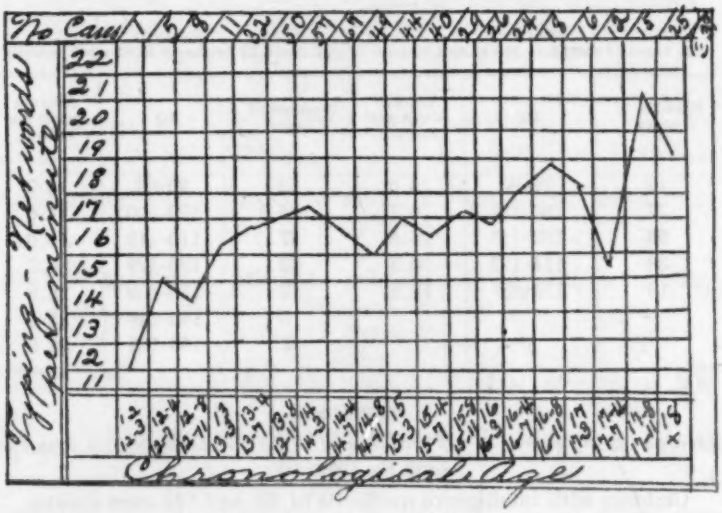

FIG. A. RELATIONSHIP BETWEEN CHRONOLOGICAL AGE AND THE MEAN TYPING SCORE OF 339 STUDENTS IN THE JUNIOR AND SENIOR HIGH SCHOOLS IN THE CITY OF LOS ANGELES, IN JUNE 1927

Only students with an IQ between 97 and 103 were chosen for this group in order to eliminate the influence of intelligence.

the IQ up to IQ 128, and then a slight dropping off in typing speed except for the exceptionally high IQ, and this is probably due to the small number of cases, as there were no extremely low scores and those receiving high scores retained their high average (table 4).

In a group of 215 children scattered over all the high schools and junior high schools of Los Angeles in June 1927 the correla-

tion of typing with chronological age was found to be .099 ±.044 for gross words and .053 ±.038 for net words per minute. Those children were selected from all the other children because of the uniformity of the IQ, the intelligence quotient being 101 and 102 for all children of the group (table 3). The results while showing a very low correlation indicates a slight advantage in favor of the older children and this advantage is borne out by table 5. The median net words for high school students was 17 words per minute while the median net words for junior high school students was 15 words per minute. In spite of the slightly higher intelligence quotient of senior high school children which might account for this advantage, an analysis of the results indicates that older children of the same intelligence quotient tend to retain a slight advantage over the younger children, as shown by table 5.

RELATIONSHIP BETWEEN TYPING AND MECHANICAL ABILITY

The results of the Blackstone typing tests were correlated with the MacQuarrie Test of Mechanical Ability. The typing test was given in the sixth week of the second semester, and the correlation is perhaps somewhat affected by the fact that first semester failures had been eliminated. The group consisted of thirty-six tenth grade pupils, which is probably too small a group to draw definite conclusions from the findings, especially since the correlations were very low, amounting to almost no correlation at all. The pursuit test showed the highest correlation of any test in the group, giving a correlation of .381 ±.097 with speed, and .093 ±.114 with accuracy. Even this is too low to be of value except to be suggestive of what tests show most promise of future possibilities in constructing an aptitude test for typing.

RELATIONSHIP BETWEEN THE THURSTONE CLERICAL TEST AND TYPING SCORES

The Thurstone Test gave a correlation of .216 ±.107 with accuracy score in typing and a correlation of .212 ±.107 typing speed. After the elimination of the Alphabetizing, Test 5, a

correlation of .46 ±.106 was secured for accuracy in typing and .436 ±.091 for speed in typing.

Since the Thurstone Test is timed for the whole test rather than for the separate individual tests no correlations of individual tests were made for this group of students. The test, however, which shows most promise seems to be the spelling checking test. Other typing correlations, made without regard for the time element, with the Thurstone separate tests were negligible.

HEALTH AND TYPING SUCCESS

In a group of 71 first semester typing students in the tenth grade of the Bell High School the Blackstone Stenographic Proficiency Test in Typewriting was given at the end of the first quarter of the school year in 1928–1929. Forms A, B, C, D, and E, were given on consecutive days and the scores averaged. The results were then tabulated into two separate groups, one made up of those students who were found to have no serious physical handicaps when examined by the school physician, and the other group made up of those students whose physical examination revealed heart or lung defects. Tonsil, adenoid and orthopedic defects seemed not to be handicaps and were not so classified.

The results showed that the mean score for the healthy group was 90 as against a mean score of 65.5 for the handicapped group. The highest score for the healthy group was 185 against a high score of 81 for the physically handicapped group. It will be noted that no child in the handicapped group managed to reach even the mean score for the healthy group.

CONCLUSIONS

1. In so far as vocational guidance is concerned no test was found to correlate highly enough with typing to make it possible to tell a child whether or not it would be worth while for him to take up typing as a vocation.

2. The fact that older children and children of higher IQ's tend to do better in typing would indicate that at least for

vocational purposes typing should be given in the senior high school rather than in the junior high school.

3. The child of high or average IQ, other things being equal has a better chance of success than the child of low IQ. However, the difference is so slight that for individual cases we are not justified in saying that the child of low IQ will not succeed, or that the child of high IQ will succeed.

4. Typing is becoming so universally necessary for all persons that it should not be looked upon in the majority of cases in the light of a vocation but should be given to all children in the junior high school as one of the fundamentals necessary for all, and in the senior high schools as a vocational subject.

THE EFFECT OF BODILY ACTION ON VOICE INTENSITY

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Not the least of those fields to which the psychological approach has been applied is that of public speaking. This study, which used to be entirely governed by the rules of rhetorical dogma and tinctured by the theoretical ideals of "successful speakers" is being rapidly submitted to the more accurate analysis of experimental science. This coalition between the study of speech and the study of psychology has already brought results of value to both. It is hoped that this modest contribution may serve to further that trend.

The use of bodily action by a public speaker has long been recognized as an important factor in the success of his efforts to persuade an audience. The audience hears what the speaker says and it sees what he does. But although the effect of the visual stimulus which the speaker's action makes upon the audience has been studied, the effect of action upon the speaker himself has not been so carefully analyzed. Particularly is it true that little attention has been paid to the possible effect of bodily action upon the voice of the speaker. In most cases voice and action have been treated as two distinct methods of communication which, although used simultaneously, were yet separate so far as the speaker was concerned. The student of public speech has been taught to "suit the action to the word; the word to action" but little consideration has been given to the possibility that action might itself affect the way in which the word was spoken.

This is easily shown by an examination of text books in the

field of speech. The principle of facilitation would suggest that the use of body muscles would make more active the vocal muscles. Yet, of seventeen such texts picked at random only five even suggested the possible effect of action on voice, and these made only general comments. The writer has been unable to find anywhere a careful study based on experimental data of the specific effect of action on voice; the few discussions he did find dealt only with general effects and were based largely on general observation rather than on controlled experimental analysis.

It seemed important, therefore, to submit the problem to experimental observation. Suppose for example that a speaker uttered the syllable "ah." Would the utterance be any different if he used a gesture during the utterance from what it would be without the gesture? The study outlined below was an attempt to begin the solution of the problem.

Inasmuch as one of the important effects of action is to add emphasis, by the visual stimulus afforded, to the syllable on which it falls, it was decided to determine whether or not such action also induces an increase in the intensity of the voice in speaking that syllable.

In the investigation the action used was the movement of the right arm in making a vigorous downward gesture. This gesture was chosen because of its relative simplicity, the frequent use speakers make of it, and the greater ease of experimental control in comparison with more complex movements. The vocalization was limited to the utterance of a simple vowel sound; and the study of the effect of action upon it was limited to its intensity.

Accordingly two series of experiments were carried out. The first consisted of a series of tests in which the subjects produced vocal sounds with and without action, within the hearing, but out of sight of a group of auditors who recorded their judgments of the degree of loudness of each sound. The second consisted of a series of laboratory tests in which the pressure of breath in exhalation was recorded by instrumentation during the production of vocal sounds both with and with-

out action. Although this latter test is not a direct test on the loudness of the sound produced it is a test of one of the factors contributing to loudness. According to Muckey[1] the pressure of air exhaled determines the amplitude of vibration of the vocal bands, and hence determines the initial amplitude of the sound wave. This in turn, barring a change of pitch or resonance (which was kept to a minimum in the experiment), also determines the intensity.[2]

Although the results of these experiments cannot be considered final or conclusive, a brief discussion of the procedure used and the findings obtained may throw some light on the subject and may serve to stimulate further and more accurate study of the problem.

EXPERIMENT BEFORE AUDITORS

In the first series of tests, that in which the audience's judgment was used as the criterion of loudness, forty-two subjects and one hundred thirty-one auditors were used. By "subject" is meant the individual who produced the vocal sound and by "auditors" is meant those who listened to the subjects and recorded their judgments of the loudness of the sound produced. In each of the seven tests, a different group of auditors was used. These groups were in each case composed of public speaking students at Northwestern University and varied in number from 25 to 55. Before each of these groups six subjects were used, a different set of subjects before each group of auditors.

[1] Muckey, F. S., Natural Method of Voice Production, (1915), pp. 105–145.

[2] In this paper, the terms "intensity" and "loudness" are used interchangeably. Strictly speaking the former denotes the physical characteristic of the sound, while the latter refers to the sensation produced upon the listener by the sound. As it was pointed out by D. C. Miller, however, (Science of Musical Sounds, 2nd edition, 1922, p. 53), "Under simple conditions, and within the range of pitch of the more common sounds of speech and music, there is a reasonable correspondence between loudness and energy."

The procedure followed in each of the seven tests was the same. The auditors were seated in their usual class room from which the subjects had been excluded, and were first given the Seashore intensity test by means of the phonograph record manufactured by the Columbia Phonograph Company (Columbia record No. 53003-D). This was done for two reasons: first, to obtain a check on the accuracy of their judgment of intensity; and second, to acquaint them with the method of comparing paired sounds.

Allowing the auditors a rest period, the experimenter went to an adjoining room where he gave the subjects their instructions, as follows:

"Stand behind the screen facing the class. Say 'ah-ah' six times as indicated on this card. Each 'ah' should be of the same pitch and loudness as its mate. Hold your voice at an absolutely colorless level. Use a simple, vigorous, downward gesture of the right hand where the 'ah' is underlined on your card."

(Figure 1 is a sample of the card given each subject. The underlined "ah's," namely those upon which the gesture was used, were distributed differently for each subject.) The subjects were told they were being tested for their ability to hold a constant tone, and were cautioned again not to vary the pitch or loudness of voice.

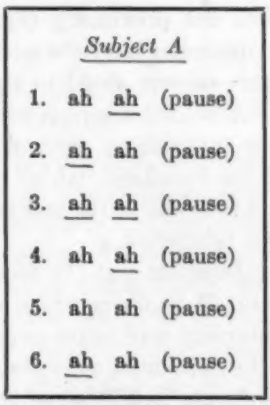

FIG. 1. SAMPLE OF CARDS GIVEN TO SUBJECTS IN EXPERIMENT BEFORE AUDITORS

	A	B	C	D	E	F
1						
2						
3						
4						
5						
6						

Instructions: You will hear two tones. You are to judge whether the second is weaker, stronger, or the same as the first. If the second is stronger, record *S*; if the second is weaker, record *W*; if the second is the same, record *O*.

FIG. 2. AUDITOR'S RECORD SHEET

Returning to the room where the auditors were seated the experimenter read aloud the instructions on the record sheet which had been given out previously (fig. 2). After making sure that these were understood by the auditors he called in the subjects singly. Each subject stood in the front of the room facing the auditors but behind a screen so that he could not be seen. He placed his instruction card on the reading stand there and produced his vocalized "ah's" using right arm gestures as indicated. At the end of the test the record sheets were collected, scored, and tabulated.

The first step in tabulation was the scoring of the Seashore tests. The records of all auditors whose score indicated that their judgment of intensity was below average were discarded. Then the records of the remainder were divided into two groups: those with a very accurate judgment of intensity (90 to 100), and those above average but not exceptional (50 to 90). It

was found, however, that the judgments made by these two groups upon the vocalized "ah's" were approximately the same, there being less than 5 per cent difference in any case, with an average difference of less than 2 per cent. For this reason, the records of the entire 131 auditors whose score on the Seashore test was above 50 were used in tabulating the results.

These records were then tabulated under four heads corresponding to the four conditions of action with which the paired sounds were produced. The judgments made when the action was on the first sound of the pair (ah-ah) were put under one head; those made when no action was used on either (ah-ah) were put under another; and a similar grouping was made for the other two (ah-ah and ah-ah). Under each one of these headings the number of judgments of each kind was counted. It will be remembered that an "s" judgment indicated that the second sound was stronger than the first; "o," that the two sounds were the same; and "w" that the second sound was weaker. The results of this tabulation are shown in table 1. Since, however, there was a difference in the number of times the sounds were produced under the various conditions of action, numbers obtained by the above tabulation were reduced to percentages. This was done according to the following formula:

$$100 \text{ per cent} = \frac{s}{s+o+w} + \frac{o}{s+o+w} + \frac{w}{s+o+w}$$

By the results of this computation it was possible to compare the judgments made by the auditors under one condition of action with those made under another, and thereby to discover whether the sounds produced with a gesture were heard by the auditors as louder than those made without action. The results of this computation are shown in table 1.

As a further check upon the significance of the differences noted, a computation was made of the probable errors of the

judgments and of the differences in judgments.[3] When the difference between two sets of results is more than four times the probable error of this difference, it is universally held that the difference is significant. In this case it was found that the

TABLE 1

Judgments made by auditors on paired sounds produced by subjects

STIMULUS	JUDGMENTS			
	Type	Number	Per cent	P.E.
(1) "ah-ah" (action on first syllable)	s_1	225	14.3	± 0.7
	o_1	447	28.4	± 0.8
	w_1	900	57.3	± 0.9
	Total	1,572	100.0	
(2) "ah-ah" (action on second syllable)	s_2	667	42.4	± 0.9
	o_2	415	26.4	± 0.8
	w_2	490	31.2	± 0.8
	Total	1,572	100.0	

Differences and probable errors

	Difference	P.E. of diff.	$\frac{\text{diff.}}{\text{P.E. of diff.}}$
	per cent	*per cent*	
Between o_1 and o_2	2.0	1.13	1.8
Between s_1 and s_2	28.1	1.09	25.4
Between w_1 and w_2	26.1	1.18	22.1
Between s_1 and w_1	43.0	1.09	39.4
Between s_2 and w_2	11.2	1.18	9.5

Key: s indicates second syllable judged louder than first; *o* indicates second syllable judged equal to first; w indicates second syllable judged weaker than first.

[3] The method used in this computation is that outlined in H. L. Rietz et al., Handbook of Mathematical Statistics, pp. 72–75. The computations were facilitated by the use of the "Table of Standard Errors and Probable Errors of Percentages for Varying Numbers of Cases" published by H. A. Edgerton and D. G. Paterson in the Journal of Applied Psychology, vol. X, no. 3, (September, 1926), p. 378 ff.

difference between "o" judgments made under the two conditions of action was not significant since it was only 1.8 times its P.E. In other words, chance accounted for the difference in the number of judgments to the effect that the sounds were equal. But the significance of the differences between the

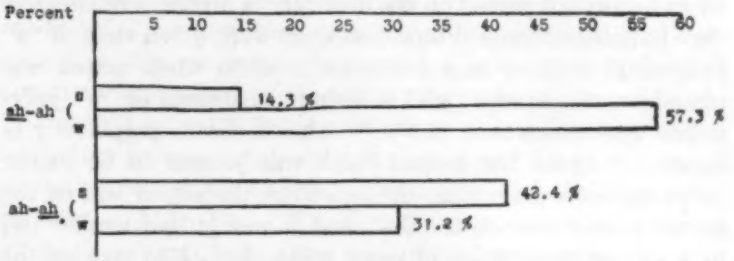

FIG. 3. COMPARISON OF AUDITORS' JUDGMENTS WHEN ACTION SHIFTED FROM FIRST TO SECOND SYLLABLE

Key: *s*, second syllable stronger; *w*, second syllable weaker; ah-ah, action on first syllable; ah-ah, action on second syllable.

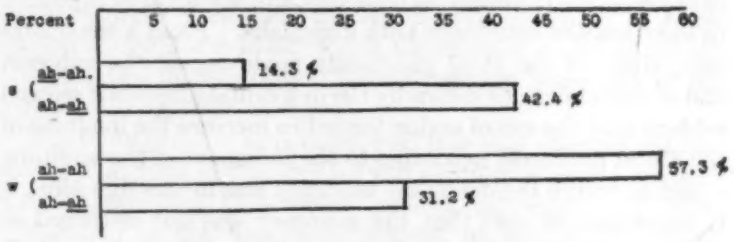

FIG. 4. SHIFT IN AUDITORS' JUDGMENTS WHEN ACTION SHIFTED FROM FIRST TO SECOND SYLLABLE

Key: *s*, second syllable stronger; *w*, second syllable weaker; ah-ah, action on first syllable; ah-ah, action on second syllable.

"s" and the "w" judgments in each case, and between the two sets of "s" judgments and the two sets of "w" judgments, is attested by the fact that the differences divided by their probable errors were, respectively, 39.4, 9.5, 25.4, and 22.1. In each case the difference was more than four times the prob-

able error, showing that the shifts in judgment of strength or weakness of the sounds were significant of actual differences.

Without going into a detailed discussion of the findings thus obtained a brief explanation is in order. It was found first of all that the use of action tended to increase the loudness of the sound. This was shown in several ways. It was found that when action was placed on the first "ah" a higher percentage of "w" judgments (second sound weaker) were given than of "s" judgments (second sound stronger); while when action was placed on the second "ah" a higher percentage of "s" judgments were given than of "w." This is shown graphically in figure 3. Again the second "ah" was judged to be louder (s) in a greater percentage of cases when the action was on the second sound than on the first; and it was judged weaker (w) in a greater percentage of cases when the action was on the first sound than on the second. This is shown graphically in figure 4. In addition to this, it was found that of the 42 subjects used, nearly three-fourths were judged to have followed the tendency shown above while about one-sixth were judged to have followed an opposite tendency, and one-sixth were judged to have reacted equally in both directions. From a consideration, then, of the total judgments made on all the subjects and of the tendencies shown by the individual subjects it seemed evident that the use of action tended to increase the loudness of the sound produced, according to the judgment of the auditors.

But although the dominant tendency was in this direction, it is important to note that the tendency was not universal or uniform. Eight subjects, for example, received fewer "w" judgments (second sound weaker) with action on the first "ah" than on the second, while seven received fewer "s" judgments (second sound stronger) with action on the second "ah" than on the first. In other words, all the subjects did not react in the same way. Moreover, as was shown by the total number of judgments on all subjects, there seemed to be a tendency for the first sound of a pair to be judged as louder than the second for some reason other than action; hence, when the action coincides with this tendency there is a greater

probability of loudness than when the action opposes it. Both these facts indicate that the tendency for loudness to follow action is not uniform or universal.

The subjects used were selected from both sexes and from all degrees of previous training in public speech. An analysis of the judgments made upon them showed no appreciable difference between either the sex or the training groups. It was concluded, therefore, that so far as this experiment was concerned neither sex nor training was a factor in the effect of action on the loudness of the sound produced.

It should be noted before passing to a consideration of the laboratory experiment that the findings stated above were based on the reaction of 42 subjects, of both sexes and of all degrees of training, as judged by 131 auditors having a sense of intensity above the average who gave a total of 4716 judgments.

LABORATORY EXPERIMENT

Beginning one month after the completion of the preceding experiment, a series of laboratory tests was given in which the same subjects were used as before. The purpose of these laboratory tests was to determine the effect of action on breath pressure used in vocalization, breath pressure being one of the factors causing voice intensity.

The basic piece of apparatus used was that constructed and used by Sherrod and Keller for the study of breath control in the Northwestern University speech laboratory in 1926. (Described in the Quarterly Journal of Speech Education, XIII, 2, 1927, p. 135 ff.) To this a mercury contact switch connected with a time-marker was attached in order to record the opening and closing of the petcock, and a system of pulley weights and levers was constructed by which the action of the subject was shown on the kymograph record. (Figure 5 shows the set-up of the apparatus.)

With this apparatus, four things were simultaneously recorded on the kymograph drum: the upper line indicated the opening and closing of the intake petcock; the second indicated

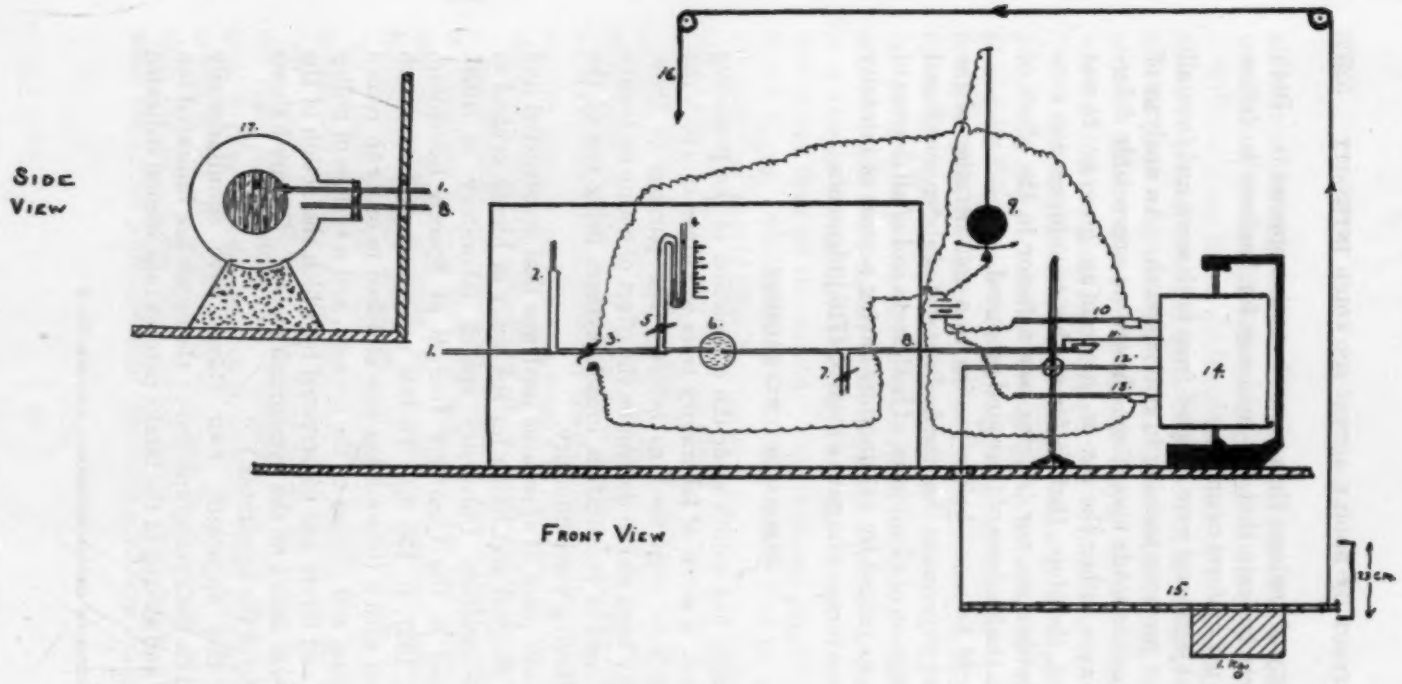

FIG. 5. APPARATUS FOR LABORATORY TESTS

Key: 1, intake tube, into which subject intones; *2*, orifice, with capillary tube; *3*, intake petcock, with mercury contact switch; *4*, mercury manometer; *5*, manometer petcock; *6*, entrance to flask containing balloon; *7*, vent, to maintain atmospheric pressure; *8*, outlet tube; *9*, seconds pendulum; *10*, time marker, connected to intake petcock; *11*, Marey tambour; *12*, lever, to record action; *13*, time marker, connected to pendulum; *14*, kymograph drum; *15*, lever, with weight; *16*, cord which subject pulls; *17*, three liter flask; *18*, balloon.

the fluctuations of the breath pressure; the third showed the action of the subject in pulling the weight; and the lowest line recorded the time in seconds. (Figure 6 is a sample record showing these four lines.)

The procedure followed was simple. Each subject was brought into the laboratory alone. A padded pinch clamp was adjusted on his nose to prevent the escape of air in that direction, and he was handed the mouthpiece to the inlet tube and instructed as follows:

"Hold the mouthpiece in your left hand and place it in your mouth. Close your lips tightly around it so as to let no air escape, and intone the vowel 'oo' continuously until you are told to stop. Keep the sound constant with no change in pitch or loudness. You are being tested for your ability to hold a constant tone."

Several trial intonations were performed during which the apparatus was tested, and the capillary tube in the orifice (no. 2 in figure 5) was adjusted so that it allowed the same amount of air to escape as was being exhaled by the subject. The subject was again instructed to keep the tone constant and the record was begun.

Nine tests were given each subject. The first was taken without action. For the second test, he was instructed as follows:

"Do the same thing again, but this time hold the handle of this pulley-cord in your right hand and some time during your intonation pull it down vigorously once, and let it up again."

Following this test, seven more were taken, in each of which the subject made but one continuous intonation but varied the number of pulls on the weight. The number of pulls, in each intonation are as follows for the nine tests: 0, 1, 2, 3, 0, 3, 2, 1, 0. Thus, a record of the breath pressure fluctuation during action was obtained for twelve instances with each subject, or 504 instances for the 42 subjects.

After the records were all taken they were analyzed and tabulated. The height of the tambour stylus, one second before

connected to pendulum; *14*, kymograph drum; *15*, lever;

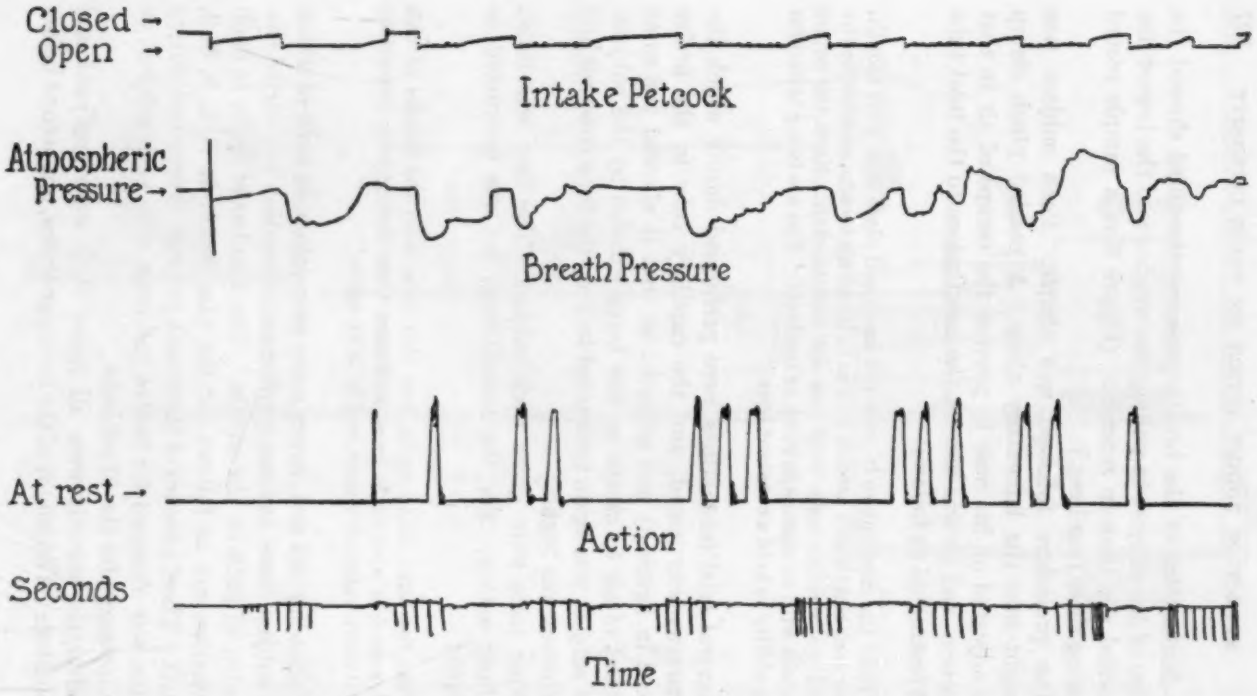

FIG. 6. PHOTOGRAPHIC COPY OF TYPICAL BREATH-PRESSURE RECORD

the action of the subject, was taken as the norm; and the distance above or below this point was determined (1) at the completion of the pull, and (2) one second after its completion. These measurements were listed as positive or negative depending on whether they were above or below the point taken as the norm, namely one second before the pull.

These measurements were tabulated in two ways. An average taken from the algebraic sum was computed for each subject, for each of the twelve pulls respectively of all the subjects, and for the total 504 pulls made by all the subjects. As a check on this, a count was made of the *number of times* the pressure increased, decreased, or remained the same—this again for each subject, for each of the twelve pulls respectively of all subjects, and for all the pulls of all the subjects. It was found that the two methods of tabulation checked perfectly with one another. A graphical representation of the findings obtained by these two methods is shown in figure 7.

The results of this laboratory experiment agreed perfectly with the results of the experiment before auditors. It was found that the use of bodily action increased breath pressure. The average for the 504 pulls showed that the stylus of the breath-pressure tambour went up 0.748 mm. when action was used above where it was before action occurred, and that it returned to a point 0.144 mm. above the norm one second after the action occurred. A similar result was recorded for each of the twelve pulls respectively as is shown in figure 7. Again, an analysis of the records of the individual subjects showed that with 34 of them action increased pressure, with 2 action made no difference, and with 6 action produced a negative result; thus, the number who showed a positive reaction exceeds the number of the other two groups by a ratio of over four to one.

Similar again to the first series of tests the laboratory experiment showed that although there was a tendency for action to increase breath pressure, this tendency was not uniform or universal. In one out of every six of the 504 instances the use of action was accompanied by a reduction of breath pressure.

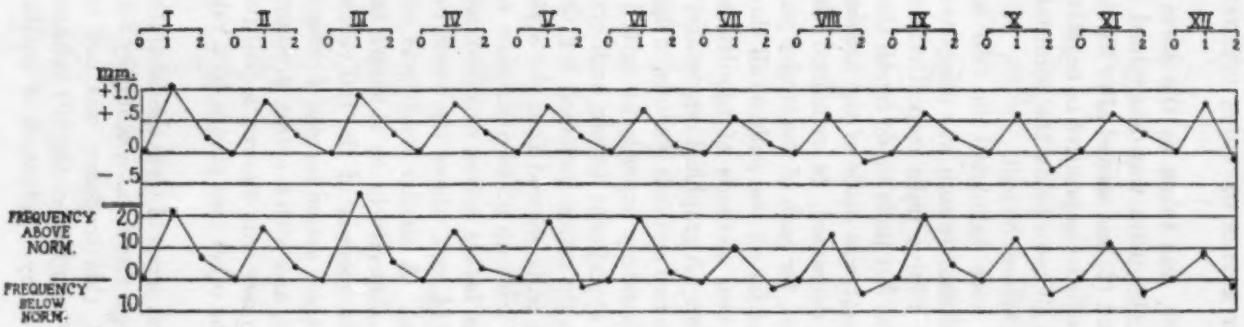

FIG. 7. MEAN AMPLITUDE, AND EXCESS OF UPWARD OR DOWNWARD FLUCTUATIONS IN RECORDS OF BREATH PRESSURE OF 42 SUBJECTS FOR EACH OF TWELVE PULLS

Key: Upper line shows average fluctuations in millimeters; lower line shows excess of positive or negative fluctuations. *0*, measurement taken one second before action (used as norm for other two measurements); *1*, measurement taken at end of action; *2*, measurement taken one second after action.

All but four of the subjects showed negative reaction at least once out of the twelve pulls each made; and six subjects showed a dominant tendency to accompany action with reduced pressure.

A comparison of the records made by the various sex and training groups again showed that no significant difference existed. This also bears out the conclusions made from the experiment before auditors.

CONCLUSIONS

Although the results of these experiments cannot be taken as conclusive or final, the similarity of the findings obtained from the laboratory tests as compared with the tests before auditors leads to the conclusion that some relationship does exist between bodily action and voice intensity. Within the scope of the present investigation, this relationship seems to be as follows: first, that the use of bodily action tends to increase the intensity of vocal sounds simultaneously produced according to the judgment of auditors; second, that the use of bodily action tends to increase the breath pressure used in the production of vocal sounds produced at the same time; third, that neither of these tendencies is uniform or universal; fourth, that neither sex nor training are significant factors in the effect of action on voice intensity or breath pressure.

Of course it may be objected that this experiment shows only a simultaneous relationship between action and vocal intensity and not a causal one. It may be said that the real modifying agent was distraction through movement, or that it was a sympathetic reaction. But this objection although valid is unimportant for the fact remains that with the use of action, voice energy increased. Whether this relation was *action-voice energy* or *action-distraction-voice energy* the beginning and end are the same.

The conclusions reached from this experiment would therefore tend to justify the speaker or teacher of speech in placing emphasis upon the study of bodily action and might throw

some light upon a certain class of speech defectives whose symptoms show a monotony of stress.

The writer feels, however, that while the scope of this experiment was not sufficiently comprehensive to establish any final conclusions, the method of investigation may prove valuable in opening a new approach to an important problem.

NOTES AND NEWS

THE JOURNAL OF APPLIED PSYCHOLOGY, Vol. IV, 1920, published "Tables to Facilitate the Computation of Coefficients of Correlation by the Rank Difference Method" by the Scott Company Laboratory. Copies of these Tables in handy pamphlet form may be purchased from THE JOURNAL OF APPLIED PSYCHOLOGY, Ohio University, Athens, Ohio, at the following prices: Single copies, 20 cents; ten or more copies at 15 cents each; in case of very large orders a somewhat lower price will be quoted.

The Sixth International Congress of Psychotechnique which was to have been held in Barcelona, Spain, September 25–29, 1929, was postponed to some time during the spring of 1930. It was thought wise to make this postponement because so many of the psychologists and psychotechnicians would find it inconvenient if not impossible to attend for the reason that they had so recently been in attendance upon the Ninth International Congress of Psychology, the sessions of which were held at Yale University, New Haven, Connecticut, from August 31 to September 6 of this year. In fact it was during these sessions that the announcement of the postponement of the Barcelona Congress was made.

The Tenth International Congress of Psychology will be held in 1932 in Copenhagen, Denmark.

The Ninth Congress marked a distinct advance in Congresses of this kind. The prediction of its President, J. McKeen Cattell, that it would be the largest gathering of psychologists in the world up to this time was more than fulfilled. The standards of membership were kept high. However, some of the places of meeting were so crowded that one promising suggestion for later meetings would be that the standards of membership be still more exacting. An even stronger argument for adhering to higher standards would be more favorable conditions for discussion. The Yale University authorities including President Angell proved to be most delightful hosts. The democratic attitude and spirit was altogether satisfying and the contribution made to this by our foreign guests was quite marked. In fact, this JOURNAL would if possible go out of its way to emphasize this aspect of the Congress to those outside the field of psychology and other sciences.

The many fields of psychology as indicated by topics covered in the various sections were: The Theory and History of Psychology, Animal

Behavior, Applications of Psychology to Methods of Teaching, Effects of Drugs, Industrial and Personnel Psychology, Maladjustments, The Psychogalvanic Reflex, Theoretical Psychology, Comparative Psychology, Educational Psychology, Character and Personality, General Intelligence and the Nature of G, Legal Psychology, Meaning and Symbolism, Psycho-Physics, Methodology and Technique, Social Psychology, Child Development, Abnormal Psychology, Eye Movements, Laboratory and Teaching Devices, Memory and Learning, Psychology of Music, Race Differences, Physiological Psychology, Statistical Methods, Sleep, Experimental Psychology, the Psychology of Aesthetics, Mental Tests, Reflexes, Sensation and Perception, Religious Psychology and the Psychology of Motivation.

No date of the publication of the proceedings of this Ninth Congress has been announced. When published they certainly will furnish to the workers in this particular science a cross-section of the work now being done the world over in the science of psychology and will certainly reveal future trends in this new but rapidly growing science.

Dean George F. Arps of the School of Education, Ohio State University, has announced the resignation of W. R. Wilson and the appointment of Drs. F. C. Dockeray and W. L. Valentine to take up especially the organization of courses in beginning psychology including the introduction of laboratory work for beginning students. Professor Wilson's work in resuming his connection with the State University of Washington, Seattle, will emphasize the development of Personnel.

BOOK REVIEWS

W. B. PILLSBURY. *The History of Psychology.* W. W. Norton and Company, Inc., New York, 1929. 326 pp.

The almost universal requirement of a knowledge of the history of psychology by the better graduate schools can hardly be said to rest upon merely traditional grounds. It is pretty generally believed by the leaders in the field, those who are in a position to fix the requirements for the higher degrees, that present day views can be adequately understood only in the light of their antecedents and in their relation to the larger trends of human thought. Yet the subject is one of the most perplexing, not only to the student preparing for his doctor's examination, but for the one who holds for himself a standard of scholarship that has more use for history than merely looking up a few names to cite in the paper he is about to publish. The materials, at best are scattered. There are a few good historical treatments of special divisions of the field which are necessarily limited in their scope. The more general works, whatever their merits, are certainly not such as to make a brief but fairly comprehensive book, bringing the subject down to the present, unwelcome. Many if not all who have a more than casual interest in the historical aspects of psychology will feel that it is high time such a book were written. And all who have come to appreciate the mature scholarship of Professor Pillsbury will feel that it is well that he should be its author.

The work begins quite traditionally with the early classical Greek psychology, unraveling the thread of psychology from the fabric of philosophy down through the later Greek and medieval periods until the time of Descartes, in whom the beginnings of the modern attitude are to be traced, however dimly. This long period occupies but two chapters.

Chapters three to fourteen deal with the main trends and the more important figures in the German, French and English development of the subject. Chapter fourteen summarizes the development of psychology in America beginning with McCosh and ending with the group whose activity was at its height near the turn of the century. Then comes a chapter on abnormal psychology, followed by a treatment of the more important schools of our own day: structuralism, functionalism, behaviorism, hormic psychology, the Gestalt school, and intuitionism.

It would be difficult to give any relative evaluation to the various parts of the book. While the reviewer found the treatment of Fechner

and Wundt especially interesting, perhaps because they were given more space than many others, other readers would be interested in different parts. Many will regret that the French group did not find a larger place in the treatment. The last part of the book, the treatment of modern schools, will be found especially valuable by most readers. The statement of the positions of the various schools will be recognized as fair and understanding. Here the author shows a power of analysis and a pointedness of criticism which, while not lacking, is less evident in the earlier parts of the book.

The book is written in a clear, readable style and contains several photographs of psychologists. To the lay reader it should prove as interesting and as valuable as a number of best sellers on allied subjects, but deserves a better fate.

The author states that it is his purpose to give a succinct account of the more important events in the development of psychological thinking and that he had in mind a book that should give a historical setting to current controversies. This he has done, and it is no criticism of his book to say that it is, unhappily, all too brief. One lays it down with the feeling that it is a work of a quality to merit a somewhat greater length.

A. C. Anderson
Ohio University.

Ordway Tead. *Human Nature and Management.* McGraw-Hill Book Company, New York, 1929. 312 pp.

This interesting book purports to tell "how to use psychology in managerial work." It certainly makes numerous interesting suggestions along these lines, steers a sensible course through controversial regions and as far as can be observed commits no psychological fallacies. Its arrangement involved devoting the first half to an outline of psychology with much of the illustrative material drawn from industry and then in the later part making the approach from the industrial side. The desirability of this arrangement,—which characterizes many books on industrial and applied psychology,—is perhaps debatable, but that is another story. At any rate this dichotomy is not especially apparent in the present work and there is plenty of management and psychology in every chapter.

The book is launched with an eclectic emphasis on "human nature" rather than the subjective or objective aspect of psychology. A number of "instincts" are discussed such as self assertiveness, submissiveness and manipulativeness. In the chapter on emotions there is considerable stress on love, broadly construed, and its rôle in management. There is a conventional discussion of the laws of learning and of economy of memory. Then follow interesting industrial illustrations of defense

mechanisms, e.g., in bullying foremen or unreasoned complaints against colleagues.

The way out of many industrial difficulties lies in the integration of conflicts of purpose and there is frequent sounding of the note of "partnership in group enterprise." The analyses of factors constituting leadership and of those conducing to morale are as good as any the reviewer has seen. However there is almost no experimental work on these problems. Similarly there is a list of factors that will improve group deliberation and planning. Prominent among these is the rôle of the chairman and his efforts to secure integration.

The chapter on selection of employees takes a conservative and favorable attitude toward tests when administered by experts but states that the interview will always be the keystone of the arch. Various methods of training employees are presented with discussion under a leader as one of the best. There is a condensed discussion of methods of presenting instructional material and even a bit of information about how to study.

The various proposals for alleviating monotony are reviewed and emphasis placed on the proposal to "arouse real interest in the hour-by-hour work process." There is an analysis of necessary prerequisites of incentives in industry and also a description of the advantages of group incentives. The book concludes with an outline of the modern democratic type of discipline and with a brief discussion of industrial democracy.

The reviewer has no adverse criticism of the book (except the collection of all footnotes at the end). It covers a good deal of ground. The quotations are numerous and wisely chosen. The industrial executive will not find it much over his head and the psychologist will not be bored. The book contains many practical suggestions for the manager. Scientist and practical man alike will find it interesting and worth while.

HAROLD E. BURTT,
Ohio State University.

PAYNTER, RICHARD H., PH.D., AND BLANCHARD, PHYLLIS, PH.D. *Study of Educational Achievement of Problem Children.* The Commonwealth Fund, Division of Publications, New York, 1929.

"The study is based upon data taken from the case records of the demonstration child guidance clinic in Los Angeles and Philadelphia. These clinics were conducted by the National Committee for Mental Hygiene as part of the Commonwealth Fund program for the prevention of delinquency, and were followed by the establishment of locally supported community clinics in those cities. This investigation was undertaken during the period while the authors were psychologists on the

staffs of the clinics." There were 167 cases in the first group, examined in 1924, and 163 cases in the second group, examined from April 1, 1925 to July 1, 1927. "Each child received a thorough clinical study, including the taking of a social history and medical, psychological, and psychiatric examinations."

The IQ's of this study are obtained by the Binet, and in addition, "the Stanford Achievement, Primary Examination for children in the second and third grades, and the Otis Classification test, Part I, of the Stanford Achievement, Advanced Examination, for those in the fourth to the ninth grades, inclusive. Some of the cases were given a modified interests analysis blank and the Woodworth-Mathews Questionnaire for emotional instability, Pintner-Paterson Performance tests, Stenquist Mechanical Assembly tests, and other special educational and vocational tests whenever indicated." All cases with an IQ below 80, and those below and above the tests used are not included in this study.

Tables I to IV give the distributions of the cases according to school grades, IQ's, EQ's, and Accomplishment Ratios, respectively. The distributions are compared to that of an unselected school group of over 4,000 cases on the basis of Accomplishment Ratios (table V), and are found to be quite similar. Tables VI to VIII show the grade placement of the two groups according to CA, MA, and EA. They compare favorably with the figures on retardation found by Strayer and quoted by Terman. Tables IX, X, and XII give the distributions of the cases according to Personality Difficulties and Behavior Difficulties and Undesirable Physical Conditions. Personality and behavior difficulties occur concomitantly in 83.2 per cent of the Los Angeles cases, and in 70.5 per cent of the Philadelphia cases. By comparison, these cases "show no undue number of physical defects." As a matter of fact, only cardiac conditions and anemia appear with much greater frequency in the problem children than in the gifted (Terman, Gen. Stud. of Gen., Vol. I). In tables XV and XVI are shown the relation of Personality and Behavior difficulties to IQ, EQ, and AR.

Some of the findings are interesting. "So far as MA and EA placements are concerned, there are no significant findings for either the Los Angeles or the Philadelphia group of cases. There is, therefore, little indication that the school progress of these children has been retarded by their behavior difficulties . . . . although we do not find that their educational achievement has been impaired to any great extent by their difficulties, we may still see that they are being ill prepared for adaptation to economic and social demands which will be made upon them in maturity. . . . . A distinct advance in the socialization of the school is indicated, however, by the increasing recognition of childhood problems which are not directly and immediately concerned with the curriculum or classroom routine. . . . .

All of the tables are put in an Appendix at the end of the book.

J. R. Gentry,
Ohio University.

RUDOLF PINTNER. *Educational Psychology.* Henry Holt and Company, New York City, 1929. 378 pp. $2.50.

This book is designed for an introductory study of educational psychology, over a period of one semester. There are two distinct parts in the book, the first dealing with original nature and the second dealing with modifications of original nature. Under the first part the author discusses original tendencies, individual differences and nature and nurture. He includes under individual differences some of the more recent work dealing with non-intellectual traits. In the second division the author discusses the laws of learning and applies them to educative problems, and also includes three chapters on educational measurements.

The text is intended to be elementary and consequently much that is controversial has been treated in a rather dogmatic fashion or omitted. The approach to new topics is made in an easy common sense fashion with little included which will baffle the student. Facts and viewpoints are stated with unusual clarity and the book is very readable—as texts go. It must be admitted that in obtaining clarity and definiteness the author has had to sacrifice much of what many teachers regard as indispensable in a scientific subject. For example the author does not show how the laws of learning were derived by experimentation, but instead merely states them and then proceeds to their application. Those who believe that the average teacher should be trained as a technician rather than a technologist (and hordes of them are so trained) will find Professor Pintner's book an excellent one for their purpose. Possibly for the immature, not too highly selected, prospective teacher the book is the best available. Those who have the task of training such teachers should consider the text seriously. However, in the opinion of the reviewer, more serious students can profit from a more difficult work.

S. M. STOKE,
Ohio University.

NEW BOOKS AND PAMPHLETS RECEIVED*

Books and pamphlets for review should be sent to James P. Porter, Department of Psychology, Ohio University, Athens, Ohio.

Academic Progress: A Follow-up Study of the Freshmen Entering the University in 1923. H. A. EDGERTON AND HERBERT A. TOOPS. Ohio State University Press, 1929, Columbus, Ohio. 150 pp.

The Adolescent, His Conflicts and Escapes. SIDNEY I. SCHWAB AND BORDEN S. VEEDER. D. Appleton Company, New York. $3.00. 365 pp.

Business and the Young Accountant. CLARENCE S. YOAKUM. Michigan Business Studies, May, 1929. University of Michigan, Ann Arbor, Mich. 50 cents. 42 pp.

Developed Lessons in Psychology. H. MELTZER AND EDWIN MAURICE BAILOR. Harcourt, Brace & Company, New York City. 199 pp.

Efficient Study Habits. MAUDE BLANCHE MUSE. W. B. Saunders Company, 1929, Philadelphia, Pa. 110 pp.

L'Enfant Turbulent. DR. H. WALLON. Librairie Felix Alcan, 108, Boulevard Saint-Germain, Paris. 653 pp.

Exercise Manual in Statistics. KARL JOHN HOLZINGER AND BLYTHE CLAYTON MITCHELL. Ginn & Company, 1929, New York City. $2.40. 160 pp.

Factory Labor Turnover in Michigan. O W. BLACKETT. Michigan Business Studies, November, 1928. University of Michigan, Ann Arbor, Michigan. 50 cents. 38 pp.

Forming Correct Language Habits. J. K. ELLWOOD. Meador Publishing Company, Boston, Mass. 174 pp.

General Psychology for College Students. CARL NEWTON REXROAD. Macmillan Company, New York City, 1929. $2.10. 392 pp.

Guide to Educational and General Psychology. JOHN P. WYNNE. Globe Book Company, New York City. $1.00. 85 pp.

Handbook of Teaching Skills. W. H. LANCELOT. John Wiley & Sons, New York City, 1929. $2.00. 198 pp.

Human Nature and Management. ORDWAY TEAD. McGraw-Hill Book Company, 370 7th Avenue, New York City. 312 pp.

Individual Differences in the Reading Ability of College Students. ERNEST MITCHELL ANDERSON. University of Missouri Bulletin, Vol. 29, No. 39. Columbia, Mo. 77 pp.

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* Mention here does not preclude further comment.

Modern Materialism and Emergent Evolution. WILLIAM MCDOUGALL. D. Van Nostrand Company, New York City, 1929. $2.75. 249 pp.

A Modern Theory of Ethics. W. OLAF STAPLEDON. E. P. Dutton & Company, New York City. $2.75. 277 pp.

The Neuroses. ISRAEL S. WECHSLER. W. B. Saunders Company, Philadelphia, Pa., 1929. 330 pp.

Psychological Foundations of Teaching. HELEN L. TONKS. Globe Book Company, New York City. $1.25. 222 pp.

Report on Progress in Manchuria, 1907–1928. The South Manchurian Railway, Dairen. 238 pp.

Sex Differences in the Association of Ideas. CATHERINE COX MILES AND LEWIS M. TERMAN. American Journal of Psychology, April, 1929, Vol. XLI, pp. 165-26. Morrill Hall, Cornell University, Ithaca, N. Y. 41 pp.

Student Personnel Work. ESTHER MCD. LLOYD-JONES. Harper & Brothers, Philadelphia, Pa. $3.50. 253 pp.

A Suggested Program of Pre-School Guidance for High Schools. Junior Council of Ohio State University. Ohio State University Press, Columbus, Ohio. 35 pp.

The Will to be Free. HOWARD V. KNOX. E. P. Dutton & Company. New York City. $4.00. 237 pp.

Directory of American Psychological Periodicals (*Continued*)

Journal of Personnel Research—Baltimore: Williams & Wilkins Co. Subscription $5.00. 500 pages approximately. Edited by Walter V. Bingham, and Clarence S. Yoakem. Bi-Monthly.

Genetic Psychology Monographs—Worcester, Mass.: Clark University Press. Subscription $7.00 per volume. Two volumes per year, 600 pages each. Edited by Carl Murchison and an international co-operating board. Monthly. Each number one complete research. Child behavior, differential and genetic psychology. Founded 1925.

Psychological Abstracts—Princeton, N. J. Subscription $6.00. 600 pages ann. Edited by W. S. Hunter. Monthly. Abstracts of psychological literature. Founded 1927.

Mental Measurement Monographs—Baltimore: The Williams & Wilkins Company. Subscription $5. 400 pages annually. Founded 1925. Edited by Knight Dunlap and Buford Johnson. Published without fixed dates, each number a single research.

Studies in Psychology and Psychiatry—Baltimore: The Williams & Wilkins Company. Subscription $5. 400 pages annually. Founded 1926. Edited by Edward A. Pace. Published without fixed dates, each number a single research.

Journal of General Psychology—Worcester, Mass.: Clark University Press. Subscription $7. 600–700 pages annually. Edited by Carl Murchison and an international co-operating board. Quarterly. Experimental, theoretical, clinical, and historical psychology. Founded 1927.

Directory of American Psychological Periodicals

American Journal of Psychology—Ithaca, N. Y.; Morrill Hall.
Subscription $6.50. 600 pages annually. Edited by M. F. Washburn, K. M. Dallenbach, M. Bentley, E. G. Boring. Quarterly. General and experimental psychology. Founded 1887.

The Pedagogical Seminary and Journal of Genetic Psychology—Worcester, Mass.: Clark University Press. Subscription $7. 700 pages annually. Edited by Carl Murchison and an international co-operating board. Quarterly. Child behavior, differential and genetic psychology. Founded 1891.

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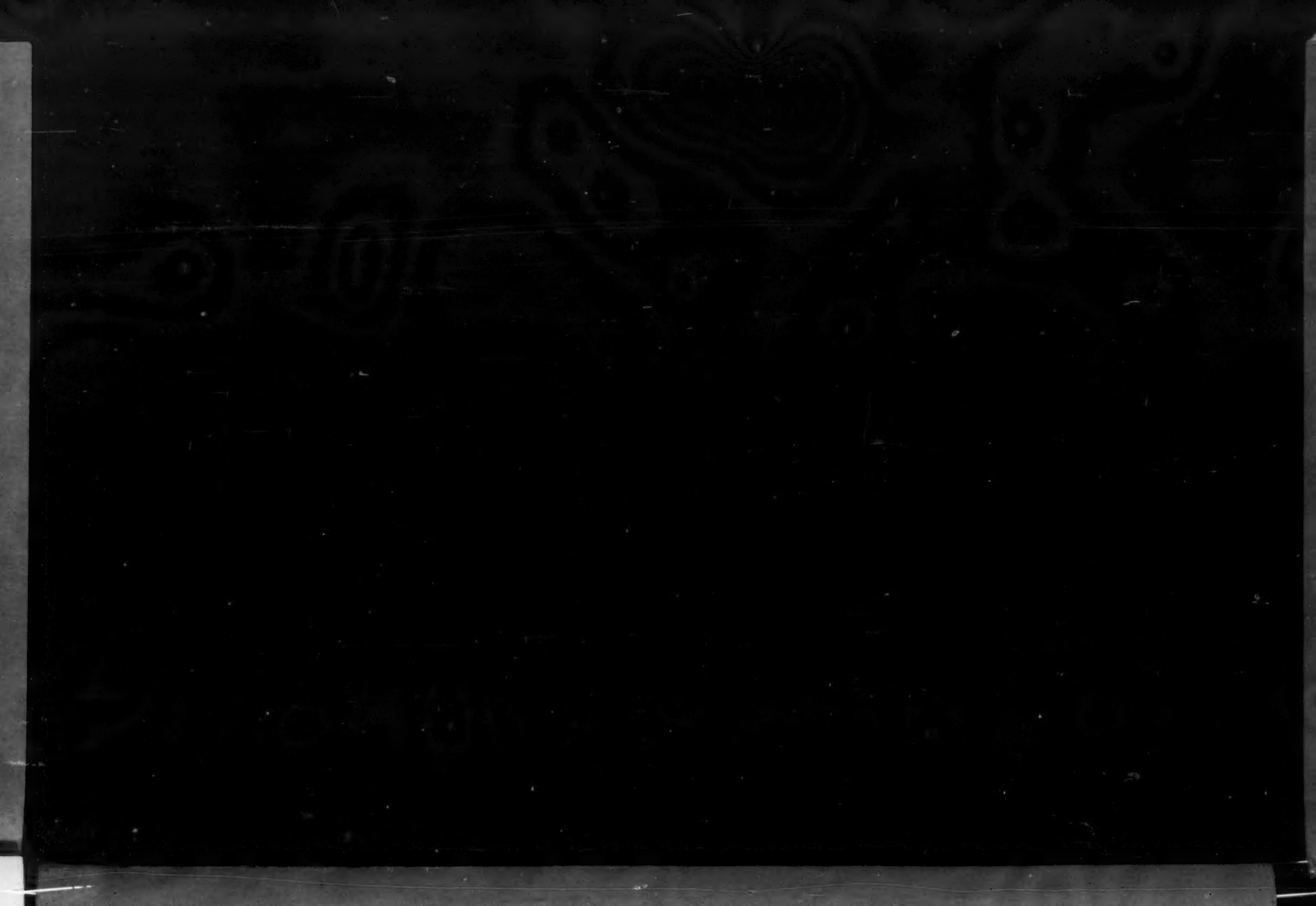
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